

505.73

A52

S. L. LIBRARY

505.73
VOL. L.

INDEX TO VOLS. XLI-L.

Established by BENJAMIN SILLIMAN in 1818.

THE
AMERICAN
JOURNAL OF SCIENCE.

EDITOR: EDWARD S. DANA.

ASSOCIATE EDITORS

PROFESSORS GEORGE L. GOODALE, JOHN TROWBRIDGE,
AND WM. M. DAVIS, OF CAMBRIDGE,

PROFESSORS A. E. VERRILL, HORACE L. WELLS, CHARLES
SCHUCHERT, H. E. GREGORY, AND HORACE S.
UHLER, OF NEW HAVEN,

PROFESSOR JOSEPH S. AMES, OF BALTIMORE,
MR. J. S. DILLER, OF WASHINGTON.

FOURTH SERIES
VOL. L.—[WHOLE NUMBER, CC.]

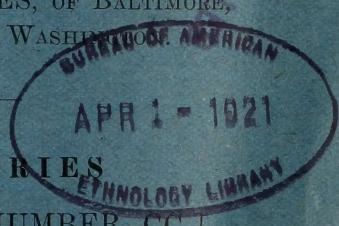
INDEX TO VOLUMES XLI-L.

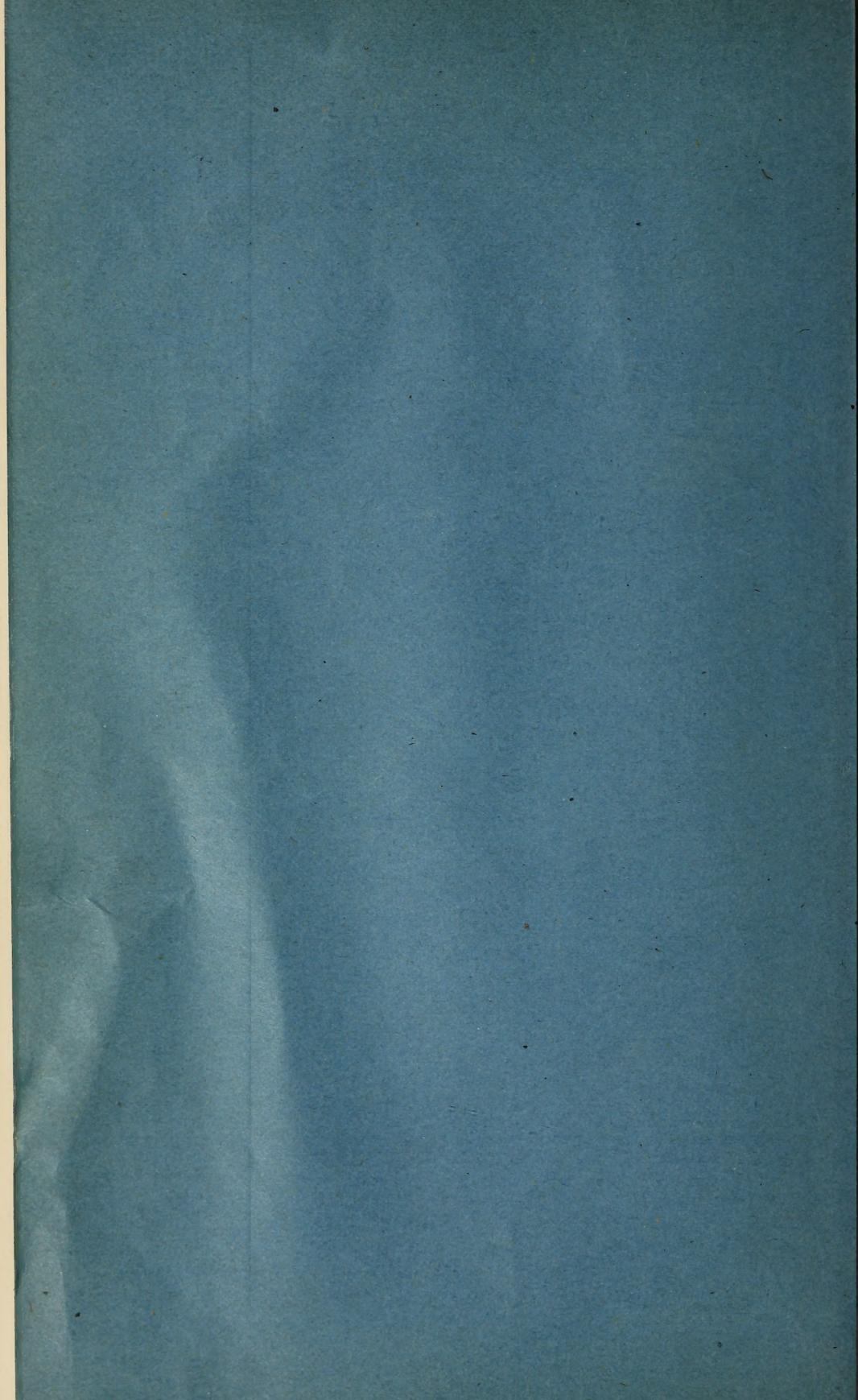
NEW HAVEN, CONNECTICUT.

JANUARY, 1921.

THE TUTTLE, MOREHOUSE & TAYLOR CO., PRINTERS, 123 TEMPLE STREET.

Index Number two dollars per copy. Sent only to those ordering it.





505.73
A52
Ser. 4
V. 50
Index
v. 41-50



GENERAL INDEX

OF

VOLUMES XLI-L OF THE FOURTH SERIES

In the references, **heavy-faced type** is used for the numbers of the volumes.

NOTE.—The names of minerals are inserted under the head of MINERALS; all obituary notices are referred to under OBITUARY. Under the heads BOTANY and BOTAN. WORKS, CHEMISTRY and CHEM. WORKS, GEOLOGY, ROCKS, ZOOLOGY, the references to the topics in these departments are grouped together; in many cases the same references appear also elsewhere.

Initial capitals are in general used for the titles of books noticed.

A

Abajo Mts., Utah, geology, Thorpe,

48, 379.

Abo Sandstone, New Mexico, Böse,

49, 51.

Academies, National, Hale, 41, 225.

Academy of Sciences, French, 45,

242.

— National, Meeting at Baltimore,

1918, 46, 772; Boston, 1916, 42,

506; New Haven, 1919, 48, 402,

478; Philadelphia, 1917, 44, 487;

Princeton, 1920, 50, 473; Wash-

ington, 1916, 41, 469; 1917, 43,

495; 1918, 45, 479; 1919, 47, 308,

451; 1920, 49, 387, 453.

Accelerations, direct determina-

tion, Galitzin, 48, 394.

Accumulator, lead, Féry, 42, 366.

Achromatoscope, Williams, 41, 101.

Acoustics, lecture experiments,

Kayser, 49, 446.

Adelie Land, metamorphic rocks,

Stillwell, 47, 388.

Adirondack Pre-Cambrian, Alling,

48, 47.

Aeronautics, 48, 249.

Agar, W. E., Cytology, 50, 77.

Agelacrinidit, from the Chazy of

New York, Clark, 50, 60.

Air Propeller, Bedell, 49, 216.

— thermal conductivity, Hercus

and Laby, 47, 299.

Airplane Characteristics, Bedell,

46, 601.

Alabama, Cretaceous Hymenæa

from, Berry 47, 65.

— geol. survey, 44, 158.

Alaska, Paleozoic glaciation, Kirk,

46, 511.

— Pribilof Is., geological notes,

Hanna, 48, 216.

Alberta, geology, Stewart, 49, 83.

Alcock, F. J., Athabasca Series, 50,

25.

Alcohol, Flint, 48, 247.

Alexander, J., Colloidal Chemistry,

48, 160.

Alexander, P. F., Northwest and

Northeast Passages, 41, 471.

Alexander, W. B., Prickly Pear, 48,

475.

Algæ, Pre-Cambrian, etc., Twen-

hofel, 48, 339.

Allan, J. A., titaniferous augite, 43,

75.

Allegheny Observatory. See Ob-

servatory.

Allen, E. T., composition of bor-

nite, 41, 409; determination of

dissociation pressures of sul-

phides, 43, 175.

Allen's Commercial Organic Analy-

sis, Davis, 44, 400.

Alling, H. L., Adirondack graphite

deposits, 47, 145; Adirondack

Pre-Cambrian, 48, 47.

Alpha particles, retardation by

metals, Vennes, 44, 69.

— — from thorium, Rutherford,

41, 561.

Alsace, potash from, Kestner, 47,

68.

A

Aluminum, absorption of X-rays, Williams, 46, 766.
AAmber, Burmese, insects in, Cockrell, 42, 135.
American Journal of Science, 1818-1918, Dana, 46, 1.
American Year Book, 1916, Wickware, 43, 496.
Ammonoids, Böse, 49, 51.
Ampère molecular currents, Einstein and de Haas, 41, 558.
Anatomy, Mammalian, Davison, 45, 151.
Anderson, W. P., Physics, 47, 229.
Anderson Esker, Reeves, 50, 65.
Andes of Southern Peru, Bowman, 43, 416.
Andrews, E. C., coral reefs in the Fiji Islands, 41, 135; geological history of Australian flowering plants, 42, 171; errata, 43, 174, 339.
Andros, S. O., Petroleum Handbook, 49, 214.
Animal Life, Thomson, 49, 220.
— Light, Harvey, 50, 474.
— Mind, Washburn, 45, 240.
— movements, etc., Loeb, 47, 81.
— See *Zoology*.
Antarctic Expedition, Brachiopoda, Thomson, 48, 397.
Appalachian, Piedmont terraces, Barrell, 49, 227, 327, 407.
Arber, A., atavism and law of irreversibility, 48, 27.
Arc lamp, cadmium vapor, Bates, 49, 378.
Archbold, M. J., Practical Electricity, 43, 249.
Arctic Expedition, Norwegian, 1898-1902, 50, 169; geol., report, Holtedahl, 45, 333.
— paleogeography, Holtedahl, 49, 1, 308.
— Seas, state of ice, Speerschneider, 43, 492.
Arctowski, H., pleionian cycle of climatic fluctuations, 42, 27; mean annual temperature variation, 43, 402.
Arisaig series, Silurian, Nova Scotia, McLarn, 45, 126.
Arithmetic, Klapper, 43, 333.
Arizona, Colorado Grand Canyon, fossil footprints, Lull, 45, 337.
— Carboniferous, Schuchert, 45, 347; Cambrian, Schuchert, 45, 362.
— watering places, Bryan, 50, 188.
Arkansas, Morrow group, Mather, 41, 375.
— etc., Pottsville formations and faunas, Mather, 43, 133.
Arldt, T., Paleogeography, 50, 238.
Armitage, F. P., Chemistry, 45, 471.
Arnold, J. L., Physics, 42, 436.
Artiodactyls, Troxell, 49, 391; new Tertiary, Lull, 50, 83.
Ashley, R. H., Chemical Calculations, 47, 439.
Association, American, meeting at Baltimore, 1918, 47, 147; New York, 1916, 42, 507; Pittsburgh, 1917, 44, 487; St. Louis, 1919, 49, 86.
Astronomical Society, vol. II, 41, 381; vol. III, 46, 768.
Astronomy, Moulton, 43, 170; Young, 46, 542; 47, 386.
Atavism, etc., Arber, 48, 27.
Athabaska Series, Alcock, 50, 25.
Atmosphere, Gases of, Ramsay, 41, 557.
Atomic number and spectral series, Bell, 47, 227.
— Weights, see **CHEMISTRY**.
Atoms, see **CHEMISTRY**.
Auditory sense, Marage, 42, 435.
Audubon, the Naturalist, Herrick, 45, 150.
Aurén, T. E., absorption of X-rays, 48, 72.
Australia, dyscrasite from, 49, 278; Great Barrier Reef, Davis, 44, 339; marine fiber, 49, 310; Prickly Pear, Alexander, 48, 475; Triassic insects, 47, 307.;
Australian flowering plants, geological history, Andrews, 42, 171; 43, 174, 339.
Autoclaving, Krauss, 44, 331.
Aviation, Carmina, 48, 473.
Azeotropism, Lecat, 49, 217.

B

Bacteriology, Agricultural, Conn., 45, 424.
Bailey, E. H. S., Qualitative Analysis, 43, 167; Sanitary and Applied Chemistry, 44, 78.
Bailey, W. S., Mineralogy, 44, 486.
Baker, C. L., stratigraphy of Eastern New Mexico, 49, 99.
Baltic Provinces, geology of, 42, 437.

Bancroft, G. R., esters from substituted aliphatic alcohols, **44**, 271.

Barbour, E. H., Ligamentum teres in Nebraska Proboscidea, **41**, 251; new mastodon from Nebraska, **41**, 522; alkali resources of Nebraska, **43**, 491; Nebraska pumice, **44**, 83.

Barker, E. H., Trigonometry, **45**, 237.

Barnett, E. DeB., Preparation of Organic Compounds, **49**, 300.

Barrell, J., geologic past of Central Connecticut, **41**, 148; growth of knowledge of earth structure, **46**, 133; nature and bearings of isostasy, **48**, 281; status of theory of isostasy, **48**, 291; Piedmont terraces of the Northern Appalachians, **49**, 227, 327, 407.
— obituary notice, Schuchert, **48**, 251.

Bartlett, H. H., coniferous woods of the Potomac formation, **41**, 276.

Barton, E. H., Mechanics of Fluids, **41**, 146.

Barus, C., interference of reversed spectra, **41**, 414; rotation of interference fringes, **42**, 63; spectrum interferometry, **42**, 402; **43**, 145.

Bascom, F., correction of rock analysis, **41**, 300.

Bassler, H., Cycadophyte from North American Coal Measures, **42**, 21.

Bassler, R. S., Index of Ordovician and Silurian Fossils, **41**, 148; Cambrian, and Ordovician, of Maryland, **50**, 237.

Bean, fossil sea, Venezuela, Berry, **50**, 310.

Bechhold, H., Colloids in Biology, **48**, 248.

Becker, G. F., obituary notice, Day, **48**, 242.

Bedell, F., Airplane Characteristics, **46**, 691; Air Propeller, **49**, 216.

Beecher's classification of trilobites, Raymond, **43**, 196.

Beekeeping, Phillips, **41**, 151.

Beetles, fossil, Illinois, Wickham, **44**, 137; Florida, Wickham, **47**, 355.

Benson, W. N., origin of serpentine, **46**, 693.

Berea formation of Ohio, etc., Verwiebe, **42**, 43.

Berger, W. R., Hogshooter gas sand, **48**, 189.

Berry, E. W., palm from New Jersey Cretaceous, **41**, 193; Upper Cretaceous floras, **42**, 81; fossil nutmeg from Texas, **42**, 241; middle Eocene members of the Sea-Drift, **43**, 298; sail fish from the Virginia Miocene, **43**, 461; obituary notice of W. B. Clark, **44**, 247; fossil plants from Bolivia, **45**, 78; restoration of Neocalamites, **45**, 445; Cretaceous Hymenæa, from Alabama, **47**, 65; age of Brandon lignite and flora, **47**, 211; present tendencies in paleontology, **48**, 1; evolution of plants and animals, **49**, 207; lower Cretaceous of Maryland, **50**, 48; floras, upper Cretaceous of Tennessee, etc., **50**, 240; fossil sea bean from Venezuela, **50**, 310; age of Dakota flora, **50**, 387.

Best, H., The Blind, **48**, 248.

Beta-rays from radium, **41**, 145.

Beverages and Adulterations, Wiley, **47**, 297.

Binary, system akermanite-gehlenite, Ferguson and Buddington, **50**, 131.

Biology, Gruenberg, **48**, 477; **49**, 84.
— Animal, Holmes, **47**, 309; Shull, Larue and Ruthven, **50**, 76.
— Civic, Hodge and Dawson, **47**, 239.
— Colloids in, Bullowa, **48**, 248.
Birds of North America, Ridgway, **42**, 86; **48**, 402.

Bishop Museum, Hawaii, Memoirs, **49**, 156.

Black Hills, bibliography of geology, etc., O'Hara, **44**, 158.

Blackwelder, E., geologic rôle of phosphorus, **42**, 285.

Blake, G. R., perchlorate method for determination of alkali metals, **44**, 381.

Blake, J. M., plotting crystal zones on paper, **42**, 486; plotting crystal zones on the sphere, **43**, 237; crystal drawing and modeling, **43**, 397; solving crystal problems, **46**, 651.
— obituary notice, **50**, 316.

Blaney, D., Pleistocene locality on Mt. Desert Island, **42**, 399.

Blichfeldt, H. F., Finite Collineation Groups, **43**, 487.

Blind, Social Survey of, Best, 48, 248.
Block Island, Miocene boulders, 41, 255.
Boltwood, B. B., relative activity of radium and uranium, 50, 1.
Bone, W. A., Coal, 47, 135.
Book Review Index, Technical, 49, 226.
Böse, E., ammonoids from New Mexico, 49, 26.
Boston basin, fossil shells in boulder clay, Morse, 49, 157.
Bosworth, T. O., Mid-Continent Oil Fields, 49, 450.

BOTANY AND BOT. WORKS.

Agricultural Bacteriology, Conn, 44, 424.
 Australia, Prickly Pear, Alexander, 48, 475.
 Australian flowering plants, geology, Andrews, 42, 171; 43, 174, 339.
 Botanical Abstracts, 47, 82.
 — research in Great Britain during the war, Bower, 47, 117.
 Botany, Densmore, 50, 78; of Crop Plants, Robbins, 45, 242; development since 1818, Goodale, 46, 399; Fossil, Guppy, 49, 372; Fundamentals, Gager, 44, 85; General, Gager, 44, 85; Problems in, Eikenberry, 50, 78.
 Cactaceæ, Britton and Rose, 49, 222.
 Cellulose, Cross and Bevan, 47, 239.
 Crop Production, Higher, Russell, 44, 86.
 Cyperaceæ, studies, Holm, no. XXVII, 48, 17; XXVIII, 49, 195; XXIX, 49, 429.
 Horticulture, Manual, Hood, 41, 381.
 Plant Anatomy, Stevens, 42, 284; Culture, Goff, 42, 284; Genetics, Coulter, 47, 239; Histology, Chamberlain, 41, 380; Pathology, Harshberger, 45, 335; Products, Chemistry, Haas and Hill, 45, 242.
 Plants, Anatomy of Woody, Jeffrey, 45, 152.
 — fossil, see **GEOLOGY**.
Posidonia australis, Read and Smith, 49, 310.

BOTANY AND BOT. WORKS.

Prickly Pear in Australia, Alexander, 48, 475.
 Soil Conditions and Plant Growth, Russell, 44, 423.
 See also **GEOLOGY**.

Bowen, N. L., sodium-potassium nephelites, 43, 115; birefringence of torbernite, 48, 195; cacoclasite, Wakefield, Quebec, 48, 440.

Bower, F. O., botanical research during the war, 47, 117.
Bowie, W., gravity and isostasy, 43, 249; distribution of isostatic compensation, 43, 471.

Bowman, I., Andes of Southern Peru, 43, 416.

Bradley, W. M., hydrozincite, 42, 59; margarosanite, 42, 159.

Brandon lignite, age, Berry, 47, 211.

Branner, J. C., Geology of Brazil, 41, 302; 49, 151.

Branson, E. B., Geology of Missouri, 47, 78; geologic section in Missouri, 49, 267.

Brazil, favas from, Farrington, 41, 355.
 — geology, Branner, 41, 302; 49, 151.

Bridgman, P. W., failure of cavities in crystals and rocks under pressure, 45, 243; stress-strain relations in crystalline cylinders, 45, 269.

British Columbia, Cyprinid fish from the Miocene, Hussakof, 42, 18.

British Museum of Natural History catalogues, 42, 87; publications, 44, 160, 408; 49, 388; 50, 473.

Britton, N. L., Cactaceæ, 49, 222.

Broderick, T. M., organic remains in iron-bearing Huronian rocks in Minnesota, 48, 199.

Brooklyn Institute, bulletin, 42, 87; 43, 342.

Brown, G. V., selensulphur from Hawaii, 42, 132.

Brown, J. C., History of Chemistry, 50, 463.

Brown, W. G., apparatus for determining freezing-point lowering, 43, 110; tri-iodide and tribromide equilibria, 44, 105; ionization of cadmium iodide solutions, 44, 453.

Browning, P. E., gallium-indium alloy, 41, 351; detection and sep-

aration of tellurium, arsenic, etc., 42, 106; separation of cæsium, etc., 42, 279; electrolysis, etc., of gallium, 42, 389; separation of gallium, 44, 221; detection of germanium, 44, 313; separation of germanium, 46, 663.

Bryan, K., rock tanks and charcos, 50, 188.

Buchanan, J. Y., Observation and Reasoning, 47, 139; Oceanography, etc., 49, 217.

Bucher, W. H., ripples and related sedimentary surface forms, 47, 149, 241.

Buckman, S. S., Brachiopoda of Burma, 50, 74.

Buddington, A. F., binary system, akermanite-gehlenite, 50, 131.

Bullowa, J. G. M., Colloids in Biology, 48, 248.

Bureau of Mines, see Mines.

Burling, L. D., Albertella fauna, 42, 469; Protichnites and Climactichnites, 44, 387.

Burlington limestone, origin of chert, Tarr, 45, 149.

Burton, E. F., Physical Properties of Colloidal Solutions, 42, 79.

Butler salt dome, Powers, 49, 129.

Butts, C., geologic section of Pennsylvania, 46, 523.

C

Cadmium vapor arc lamp, Bates, 49, 378.

Cady, H. P., Qualitative Analysis, 43, 167; Chemistry, 43, 247.

Cæsium chloride, double salts, Jamieson, 43, 67.

Calcite group, crystal structures, Wyckoff, 50, 317.

Calcium carbonate, various forms of, Johnston, Merwin and Williamson, 41, 473.

— phosphate in meteoric stones, Merrill, 43, 322.

— see CHEMISTRY.

California, Tejon Eocene, Dicker-
son, 42, 80.

Calorimeter, new form, MacInnes and Braham, 45, 72.

Calorimetry, see Heat.

Cambrian, see GEOLOGY.

Camel, Oligocene, Troxell, 43, 381.

Canada, Dept. of Mines, see Mines.

— geol. survey, see Geological Reports.

Cape Town, calcium carbonate dome, Maury, 44, 369.

Carmina, B. F., Aviation, 48, 473.

Carnegie Foundation, annual reports, tenth, 42, 88; eleventh, 44, 407; twelfth, 45, 483; thirteenth, 48, 400; fourteenth, 49, 386; Bulletins, no. 8, 42, 88; no. 9, 42, 166; no. 10, 44, 407; no. 11, 46, 772; no. 12, 47, 83; no. 13, 48, 400.

— — report on preparation of teachers, 50, 171.

Carnegie Institution of Washington, publications, 41, 305; 42, 508; 43, 341; 44, 408; 45, 483; 47, 80, 83; 48, 163, 401; 49, 224, 387; 50, 473.

— — Year Book, no. 14, 1915, 41, 377; no. 15, 1916, 43, 340; no. 16, 1917, 45, 480; no. 17, 1918, 47, 450; no. 18, 1919, 49, 454.

Carnotite, 41, 214.

Carrizo Mountain, Arizona, igneous geology, Emery, 42, 349.

Carroll, R. S., Mastery of Nervousness, 45, 241.

Case, E. C., Permo-Carboniferous red beds of No. America, 41, 219; amphibian fauna at Linton, Ohio, 44, 124; Stylemys nebrascensis, 47, 435.

Catalysis, Jobling, 41, 368.

Cavities in crystals and rocks, under pressure, Bridgman, 45, 243.

Cellulose, Cross and Bevan, 47, 239.

Century of Science, 1818-1918, 46, 1 *et seq.*

Ceramic Society, Journal, 46, 619.

Chamberlain, C. J., Plant Histology, 41, 380; Living Cycads, 47, 449.

Chamberlain, J. S., Organic Agricultural Chemistry, 42, 165.

Chamberlin, T. C., Origin of the Earth, 42, 167, 371; mathematics of isostasy, 49, 311.

Chandler, C. F., Reminiscences, 43, 245.

Charnockite series of igneous rocks, Washington, 41, 323.

Chemical Society, Amer., Priestley Memorial, 44, 332.

CHEMICAL WORKS.

- Allen's Commercial Organic Analysis, **44**, 400.
- Analysis, Qualitative, Bailey and Cady, **43**, 167; Fay, **47**, 225; Test and McLaughlin, **48**, 469.
- Quantitative, Gooch, **41**, 294; Mahin, **47**, 449; Smith, **48**, 468.
- Volumetric, Knecht and Hibbert, **47**, 226.
- Catalysis and Applications, Jobling, **41**, 368.
- Catalytic Hydrogenation, Maxted, **47**, 441.
- Chemical Analysis, Rockwood, **41**, 144.
- — of Rocks, Washington, **48**, 161.
- — Qualitative, Scott, **48**, 70.
- — of Special Steels, Johnson, **47**, 297.
- Calculation Tables, Wells, **48**, 161.
- Calculations, Ashley, **47**, 439.
- Combinations among Metals, Guia and Robinson, **46**, 689.
- French, Dolt, **50**, 463.
- Physiology, Cramer, **46**, 549.
- Reactions, Falk, **50**, 464.
- Chemie, Histoire, Delacre, **49**, 443.
- Chemistry, Agricultural, Chamberlain, **42**, 165; Fraps, **44**, 159; Hedges and Bryant, **44**, 85.
- Analytical, Muter, **44**, 400; Treadwell and Hall, **42**, 74; Villavecchia (Pope), **45**, 329; **46**, 765.
- College, Noyes, **49**, 444.
- Elementary, McPherson and Henderson, **45**, 233.
- Engineering, Stillman, **43**, 166.
- First Stage, Armitage, **45**, 471.
- of Foods, Sherman, **46**, 548.
- General, Cady, **43**, 247; Hale, **44**, 399.
- History of, Brown, **50**, 463.
- Industrial, Thorpe, **46**, 615, 689; **47**, 135, 382; Thorp and Lewis, **42**, 165.
- Inorganic, Holleman and Cooper, **43**, 80; Mellor, **46**, 541; Molinari, **50**, 73.
- in the Home, Weed, **45**, 471.
- of Metabolism, Problems, von Fürth and Smith, **42**, 442.
- in Old Philadelphia, Smith, **47**, 383.

CHEMICAL WORKS.

- Chemistry, Organic, Cohen, **45**, 233; Noyes, **43**, 81; Stoddard, **47**, 135; von Richter and Spielmann, **41**, 368; **48**, 469.
- Physical, Lewis, **42**, 75; **48**, 160; van Klooster, **49**, 147.
- Physiological, Hawk, **42**, 76; **47**, 148.
- Practical, Neville and Newman, **49**, 376.
- Progress for 1915, Annual Reports, **42**, 166.
- progress of, 1818-1918, Wells and Foote, **46**, 259.
- of Proteins, Robertson, **46**, 548.
- Sanitary and Applied, Bailey, **44**, 78.
- Theoretical, Getman, **46**, 765; Nernst and Tizard, **43**, 486.
- Chemists' Handbook, Liddell, **41**, 558.
- — Gas, **43**, 411.
- Manual, Meade, **45**, 416.
- Coal and its Uses, Bone, **47**, 135.
- Colloidal Chemistry, Alexander, **48**, 160; Ostwald and Fischer, **41**, 295; **47**, 226.
- Solutions, Burton, **42**, 79.
- Colloids, in Biology, Bechhold and Bullowa, **48**, 248; Physics and Chemistry, Hatschek, **41**, 368; **48**, 160; **50**, 73.
- Electro-Analysis, Smith, **46**, 766.
- Electrochemical Equivalents, Hering and Getman, **44**, 399.
- Electrolysis in Chemical Industry, Hale, **47**, 135.
- Food Analysis, Winton, **44**, 77.
- Hydrogen, Chemistry and Manufacture, Teed, **48**, 470.
- Laboratory Manual, Blanchard and Wade, **46**, 542; McPherson and Henderson, **41**, 144.
- Organic Coloring Matters, Natural, Perkin and Everest, **47**, 382.
- Compounds, Barnett, **49**, 300; Identification of Pure, Milliken, **42**, 166; Solubilities of, Seidell, **49**, 78.
- Reagents and Reactions, Tognoli, **45**, 328.
- Stoichiometry, Young, **46**, 689.
- Woodhouse, James, Chemist, 1770-1809, **46**, 541.
- Zinc Industry, Smith, **46**, 689.

CHEMISTRY.

Acetates, tests for, Curtman and Harris, **44**, 332.
 Acetylene, colorimetric determination, Weaver, **41**, 463.
 Acidimetry of colored solutions, Tingle, **47**, 69.
 Alkalimetry, yellow mercuric oxide as standard, Incze, **44**, 479.
 Alloys, reactive, Ashcroft, **49**, 299.
 Aluminium, determination, Blum, **42**, 432.
 Ammonia, new method for estimating, Foxwell, **42**, 74.
 Ammonium chloride as food for yeast, Hoffman, **43**, 246.
 Aqua regia, action on gold-silver alloys, **50**, 315.
 Argon, atomic weight, Leduc, **47**, 134.
 Arsenate, lead-chlor, McDonnell and Smith, **42**, 139.
 Arsenic and Antimony, compounds of, Morgan, **46**, 615.
 — in organic compounds, estimation, Ewins, **45**, 72.
 — Pearson's method, modifications of, **48**, 391.
 Atomic weights, report of International Committee, **49**, 78; as integers when O = 16, **49**, 212.
 Atoms, complex, Harkins, **45**, 141; intermolecular transpositions, von Hevesy and Zechmeister, **50**, 314; and molecules, electrons in, Langmuir, **48**, 69.
 Barium from brines, Skinner and Baughman, **43**, 246.
 — and strontium, separation, Gooch and Soderman, **46**, 538.
 Bismuth oxychloride, solubility, Noyes, Hall and Beattie, **45**, 71.
 Boric acid in determination of ammonia, Scales and Harrison, **49**, 443.
 Cadmium iodide solutions, ionization, Van Name and Brown, **44**, 453.
 Cæsium chloride salts, Jamieson, **43**, 67.
 — etc., separation, Browning and Spencer, **42**, 279.
 Calcium tartrate, crystallization, Chattaway, **42**, 497.
 Carbohydrates and the glucosides, Armstrong, **50**, 464.

CHEMISTRY.

Carbon, activation, Chaney, **49**, 212; atomic weight, Batuecas, **47**, 69; detection, Mueller, **45**, 73; Penfield test, Mixter and Haigh, **43**, 327.
 — monoxide, free, in kelp, Langdon, **43**, 165.
 Carbonates, alkali determination, Dubrisay, Tripier, and Toquet, **47**, 296.
 Cerium, determination, Lenher and Meloche, **41**, 217.
 Chlorides in presence of thiocyanates, **42**, 498.
 Chlorine, free, new reagent, Leroy, **43**, 80.
 Cobalt, new volumetric method, Engle and Gustavson, **42**, 431; **43**, 328.
 Colloidal, Colloids. See **CHEM. WORKS.**
 Copper and iron, determination, Edgar, **41**, 462; Ley, **45**, 470.
 Copper sulphate, basic, Young and Stearn, **42**, 497.
 — test for, Lyle, Curtman and Marshall, **41**, 463.
 Cupferron in analysis, Lundell and Knowles, **49**, 376.
 Cyanamide, preparation, Werner, **44**, 478.
 Dialkylphosphoric and benzene-disulphonic acids, preparation, Drushel and Felty, **43**, 57.
 Electrolytic analysis, Gooch and Kobayashi, **43**, 391.
 Esters from substituted aliphatic alcohols, Drushel and Bancroft, **44**, 371.
 Fluorine, Gautier and Clausmann, **42**, 364; determination, Gooch and Kobayashi, **45**, 370; in soluble fluorides, Dinwiddie, **42**, 464.
 Gallium, electrolysis, etc., Browning and Uhler, **42**, 389; Uhler, **43**, 81; separation, Browning and Porter, **44**, 221; **49**, 213; from U. S. spelter, Hillebrand and Scherer, **41**, 367.
 Gallium-indium alloy, Browning and Uhler, **41**, 351.
 Gases, see **Gases**.
 Gasoline, etc., manufacture, Rittman, Dutton and Dean, **41**, 462.
 Germanium, detection, Browning and Scott, **44**, 313; **46**, 663;

CHEMISTRY.

in zinc materials, Buchanan, **42**, 430.
Glucosane, Pictet and Castan, **50**, 392.
Glycerine, new source, **47**, 225; preparation by fermentation, Schweiser, **47**, 381.
Helium, see **Helium**.
Hydrocarbons, liquid, production, Fischer, **41**, 557.
Hydrofluoric and fluosilicic acids, Dinwiddie, **42**, 421.
Hydrogen, desulphurizing action on coke, Powell, **50**, 463; ionization, Dempster, **42**, 76.
— peroxide, determination, Jamieson, **44**, 150.
Hydrogenation, catalytic, Maxted, **47**, 441.
Hydrolysis of hypophosphoric acid solutions, Van Name and Huff, **45**, 103.
Hypophosphates, preparation, Van Name and Huff, **46**, 587.
Indicator for bases and acids, Chauvierre, **49**, 209.
Iodides, detection, Curtman and Kaufman, **46**, 614.
Iodine, action of light upon, Bordiner, **42**, 496.
Iron, estimation of, Edgar and Kemp, **45**, 470; rotating reductors in the determination, Scott, **49**, 77; spectrum, Hemmlech, **43**, 413; as thiocyanate, estimation, Willstätter, **50**, 392.
Isotopes, see **Isotopes**.
Lead, atomic weight, Richards and Wadsworth, **43**, 166; density of, from radioactive minerals, **41**, 293.
— isotopes, melting points, Richards and Hall, **50**, 314; isotopic, Clarke, **46**, 764; forms of, separation, Richards and Hall, **43**, 409.
— supposed allotropic form, Thiel, **50**, 392.
Lithium, separation from potassium, etc., Palkin, **42**, 496.
Manganese, colorimetric determination, Willard and Greathouse, **44**, 478; in soils, Johnson, **43**, 410; electrolytic determination of, Gooch and Kobayashi, **44**, 53.
Mercury, critical temperature,

CHEMISTRY.

Bender, **41**, 295; determination, Jamieson, **47**, 438.
Metals, common, qualitative separation, Clarendon, **42**, 364; solution in ferric salts, Van Name and Hill, **42**, 301; specific heats at low temperatures, Eastman and Rodebush, **45**, 327.
Molecular frequency, Allen, **46**, 544; volumes, **41**, 294; weights, apparatus for determining, Chapin, **46**, 613.
Molybdenum, determination, Jamieson, **43**, 329.
Neon, thermal conductivity, Banawitz, **41**, 296.
Nitrite, determination, Dienert, **47**, 69; disodium, Maxted, **45**, 142.
Nitrogen, fixation, **43**, 329; modification, Strutt, **42**, 368.
Nitrous acid, determination, Laird and Simpson, **47**, 382.
Osmium, new reaction, Tschugaeff, **46**, 689.
Paper pulp as a filter, Jodidi and Kellogg, **41**, 557.
Paraffine, oxidation, Kelber, **50**, 72.
Perchlorate method, Gooch and Blake, **44**, 381.
Periodic table, Hackh, **46**, 481.
Permanganate solution, Halverson and Bergeim, **45**, 232.
Phosphorous, etc. acids, estimation, Van Name and Huff, **45**, 91.
Photographic phenomenon, McArthur and Stewart, **49**, 146.
Platinum wire in bead and flame tests, Kiplinger, **49**, 449.
Potash in Alsace, Kestner, **47**, 68; cobalt-nitrite method for the determination of, Haff and Schwartz, **45**, 71; from cement mills, Merz, **45**, 232; from feldspar, **41**, 143; from greensand, Charlton, **45**, 142; from kelp, Higgins, **46**, 764; from sea water, Hildebrand, **45**, 231; salts in the United States, Ruhm, **50**, 315; volatilization from cement, Anderson and Nestell, **43**, 329.
Potassium, recovery from mineral silicates, Frazer, etc., **44**, 398; volumetric method, Ajon, **41**, 142; iodate titrations, Ja-

CHEMISTRY.

mieson, 45, 416; nitrate, Chile, Holstein, 49, 298.
Radium. See **Radium.**
 — sulphate, solubility, Lind, Underwood, etc., 45, 327.
Rare Earths, Spencer, 49, 78.
 Rubidium and cæsium, determination, Robinson, 45, 142.
 Silicon, thermo-chemistry, Mixter, 42, 125.
 Silver, rate of solution in chromic acid, Van Name and Hill, 45, 54; separation from mercury, Zweigbergk, 41, 215; volumetric method, new, Schneider, 45, 416.
 Sodium peroxide, use in combustion calorimetry, Mixter, 43, 27.
 Soils, organic matter in, Rather, 46, 688.
 Solids, diffusion of, Van Orstrand and Dewey, 41, 216.
 Stannous and lead halogen salts, Rimbach and Fleck, 41, 556.
 Succinic acid as a standard, Peters and Sauchelli, 41, 244.
 Sucrose in acid vegetable juices, Colin, 50, 393.
 Sulphur, sulphide, estimation, Drushel and Elston, 42, 155; liquid, Kellas, 47, 297.
 Sulphurous acid, preparation, Hart, 43, 411.
 Tellurium, arsenic, etc., detection and separation, Browning, et al., 42, 106.
 Thorium, emanation method for determination, Cartledge, 47, 134; oxidimetric determination, Gooch and Kobayashi, 45, 227; separation from iron, Thornton, 42, 151.
 Tin, arsenic and antimony, separation, Welch and Weber, 42, 74; hydride, Peneth and Furth, 49, 298; and tungsten, new method of separation, Travers, 44, 479.
 Tri-iodide and tri-bromide equilibria, Van Name and Brown, 44, 105.
 Tungsten, occurrence, Runner and Hartmann, 47, 225.
 Uranium, Chemistry, Pierlé, 49, 146.
 — dioxide, preparation, Parsons, 43, 485.
 Vanadic acid, determination,

CHEMISTRY.

Gooch and Scott, 46, 427; Edgar, 42, 365.
 Vanadium, determination, Turner, 41, 339; 42, 109; in sedimentary rocks, Phillips, 46, 473.
 Vapors in gases, estimation of, H. S. and M. D. Davis, 46, 688.
 Weighing, analytical, Wells, 49, 375; deflection method of, Brinton, 48, 390.
 Yttrium, separation, Bonardi and James, 41, 142.
 Zinc, determination, Jamieson, 46, 614; Howden, 47, 70.
 Zirconium, determination, Lundell and Knowles, 48, 67; Smith and James, 50, 393.
 Chert, origin, Tarr, 44, 409; 45, 149; Van Tuyl, 45, 449.
 — California, Davis, 47, 234; Kansas, Twenhofel, 47, 407; Missouri, formation, Dean, 45, 411.
 Cincinnati, geology, Fenneman, 43, 172.
 Clark, A. H., Existing Crinoids, 41, 150.
 Clark, B. M., Introduction to Science, 45, 420; Laboratory Manual, 45, 420.
 Clark, T. H., Agelacrinitid, from Chazy of New York, 50, 69.
 Clarke, F. W., Data of Geochemistry, 41, 376; constitution of melilite and gehlenite, 43, 476.
 Clay, dolomitic, Ries, 44, 316.
 Cleland, H. F., Geology, 42, 282.
 Climatic Control, Humphreys, 49, 305; fluctuations, pleionian cycle of, Arctowski, 42, 27.
 Coal beds in West Virginia, Hennen, 46, 770.
 — Coal Industry, 42, 503; and Uses, Bone, 47, 135; water content, genesis and nature, Mack and Hulett, 43, 80; and Smyth, 45, 174; origin of brown, Stevenson, 43, 211.
 Coast Survey, United States, annual report, 1915, 41, 305; 1916, 43, 253; 1918, 47, 309; 1919, 49, 309.
 — — Centennial celebration, 42, 505.
 — — Magnetic chart, 41, 466.
 — — degree awarded to Wm. Bowie, 48, 249.
 Cockerell, T. D. A., insects in Bur-

mese amber, 42, 135; 44, 360; fossil parasitic hymenoptera, 47, 376.

Coe, W. R., a century of zoology in America, 46, 355; notice of R. Rathbun, 46, 757.

Cohen, J. B., Organic Chemistry, 45, 233.

Coleman, A. P., wave work as a measure of time, 44, 351, 487.

Collineation Groups, Finite, Blichfeldt, 43, 487.

Colloidal, Colloids. See **CHEM. WORKS.**

Color Vision, theory, Houstoun, 42, 433.

Colorado age of Scranton coal, Richardson, 43, 243.

- fossil footprints from the Grand Canyon, Lull, 45, 337; Carboniferous, Schuchert, 45, 347; Cambrian, 45, 362.
- Geology of the Raton Mesa, Lee and Knowlton, 47, 74, 142.
- mineral springs, radioactive properties, Lester, 46, 621.
- Raton Mesa, geology, Lee and Knowlton, 47, 74, 142.

Coloring Matters, Natural Organic, Perkin and Everest, 47, 382.

Comstock, D. F., Matter and Electricity, 43, 414.

Congress, Library of. See **Library.**

Coniferous woods, Potomac, formation, Sinnott and Bartlett, 41, 276.

Conn, H. W., Agricultural Bacteriology, 45, 424.

Connecticut, central, in the geological past, Barrell, 41, 148.

- geol. survey. See **GEOL. REPORTS.**
- insects of, Viereck, etc., 44, 83; marine terraces, Hatch, 44, 319; Valley, Triassic life, Lull, 41, 147.

Continental fracturing, Oceanica, Schuchert, 42, 91.

Coral reef problem and Funafuti borings, Skeats, 45, 81; the formation of dolomite, Skeats, 45, 185; and isostasy, Molengraaff, 44, 153.

- see **Davis, W. M.**
- zone and the glacial period, Daly, 48, 136.
- reefs, in the Fijis, Andrews, 41, 135.
- and coral islands, Murray Is., 47, 80.

Corona, influence of a series spark on, Crooker, 45, 281.

Cosmogony, Jeans, 49, 150.

Cotton, C. A., block mountains in New Zealand, 44, 249; 45, 149.

Coulter, J. M., and **M. C.**, Plant Genetics, 44, 239.

Cramer, W., Chemical Physiology, 46, 549.

Crehore, A. C., Matter and Energy, 45, 76.

Cretaceous, lower, in Maryland, Berry, 50, 48.

Crew, H., Physics, 42, 50.

Crooker, S. J., influence of a series spark on the direct current corona, 45, 281.

Crooks, H. F., Early Silurian rocks of No. Michigan, 45, 59.

Crops, Manuring for, Russell, 44, 86.

Cross, C. F., Cellulose, 47, 239.

Cross, W., obituary notice of Louis V. Pirsson, 50, 173.

Crowther, J. A., Life of Faraday, 47, 230; Molecular Physics, 48, 473; Ions, Electrons, etc., 49, 381.

Crustacea, Paleozoic, Vogdes, 44, 336.

Crystal drawing and modeling, Blake, 43, 397; optics, use of graduated sphere, Warren, 42, 493; problems, Blake, 46, 651; structure, Whitlock, 49, 259; of calcite group, Wyckoff, 50, 317; zones, plotting, Blake, 42, 486; 43, 237.

Crystallography and Mineralogy, new journal, Goldschmidt, 50, 398.

Crystalline cylinders, stress-strain relations in, Bridgman, 45, 269.

Crystals, growth under external pressure, Taber, 41, 532; method of growing large, Moore, 48, 391; salt, formation, Long, 43, 289.

Cunningham, E., Relativity and the Electron Theory, 41, 297.

Cushny, A. R., Secretion of Urine, 44, 159.

Cutbush, James, Amer. Chemist, 1788-1823, Smith, 49, 79.

Cuttingsville, Vt., eruptive rocks, Eggleston, 45, 377.

Cuzco, Peru, geology, Gregory, 41, 1; Indians of, Ferris, 43, 339.

Cycadophyte, classification, Wieland, 47, 391; from No. Amer. Coal Measures, Bassler, 42, 21.

Cycads, Amer. Fossil, Wieland, 43, 333; 46, 645; 47, 391.
— Living, Chamberlain, 47, 449.

Cylinders of scoriaceous diabase, Emerson, 41, 321.

Cyperaceæ, studies, No. XXVII, Holm, 48, 17; no. XXVIII, 49, 195; no. XXIX, 49, 429; no. XXX, 50, 159.
— see BOTANY.

Cytology, Agar, 50, 77.

D

Dakota flora, age, Berry, 50, 387.

Dale, T. N., Algonkian Cambrian boundary in Vermont, 42, 120; unconformity of Berkshire schist and Stockbridge limestone, 49, 369.

Dall, W. H., Bivalve Mollusks of the west coast of America, 42, 439.

Daly, R. A., problems of the Pacific Islands, 41, 153; geology of Pigeon Point, Minnesota, 43, 423; coral-reef zone and glacial period, 48, 136.

Dana, E. S., American Journal of Science, 1818-1918, 46, 1.

Darton, N. H., geology of Luna County, New Mexico, 42, 82; Grand Canyon, 44, 158.

Daugherty, L. S. and M. C., Economic Zoology, 45, 335.

Davies, A. M., Paleontology, 50, 467.

Davis, M. M., Jr., Dispensaries, 46, 771.

Davis, W. A., Allen's Commercial Organic Analysis, 44, 400.

Davis, W. M., Great Barrier Reef of Australia, 44, 339; Geological Handbook of Northern France, 45, 479; Cedar Mt. trap ridge near Hartford, 46, 476; notice of, G. K. Gilbert, 46, 669; framework of the earth, 48, 225.

Davison, A., Mammalian Anatomy, 45, 151.

Day, A. L., obituary notice of G. F. Becker, 48, 242.

Dayton, Ohio, geology, Foerste, 41, 302.

Dean, R. S., formation of Missouri cherts, 45, 411; electron theory of passivity, 47, 123; Physical Chemistry of Metals, 49, 147.

Delacre, M., Histoire de la Chemie, 49, 443.

De Moraes, L. F., ferrazite, 48, 353.

Density of solids, Le Chatelier and Bogitch, 43, 79; balance for solids, Gasnault, 47, 72.

Densmore, H. D., Botany, 50, 78.

Devonian of Central Missouri, Greger, 50, 20.

Diamond, dispersion, Silberstein, 47, 441.

Diamonds, in 1919, 50, 472.

Diastrophism in the Atlantic-Arctic region, Holtedahl, 49, 1; in Northeastern America, Schuchert, 50, 399; in Oceanica, Schuchert, 42, 91.

Diatoms, fossil, from Pribilof Islands, Hanna, 48, 216.

Diffusion and rhythmic precipitation, Stansfield, 43, 1.

Dighton conglomerate, Perkins, 49, 61.

Diller, J. S., notice of Arnold Hague, 44, 73.

Dinosaurs, functions of the "sacral" brain in, Lull, 44, 471.
— See GEOLOGY.

Dinwiddie, J. G., hydrofluoric and fluosilicic acids, 42, 421; fluorine in soluble fluorides, 42, 464.

Dispensaries, Davis and Warner, 46, 771.

Dissociation pressures, determination, Allen and Lombard, 43, 175.

Dolomite formation and the coral reef problem, Skeats, 45, 81, 185; origin, Van Tuyl, 42, 249.

Dolt, M. L., Chemical French, 45, 417; 50, 463.

Downing, E. R., Biological Nature Study, 48, 162.

Drops and vortices, forms assumed by, Hatschek, 47, 383.

Drushel, W. A., sulphide sulphur, 42, 155; dialkylphosphoric acids, etc., 43, 57; esters from substituted aliphatic alcohols, 44, 371.

Dryer, C. R., Economic Geography, 45, 484.

Duckworth, W. L. H., Morphology and Anthropology, 41, 564.

Duclaux, E., Pasteur, 50, 80.

Duff, A. W., Physics, 42, 437.

Dunbar, C. O., Rensselärina, 43, 467; Devonian of West Tennessee, 46, 732.

Duparc, L., Russian studies, 49, 451.

Dustfall of March 9, 1918, Winchell and Miller, 46, 599; 47, 133.

E

Earth, Evolution of, Barrell, Schuchert, etc., 46, 770; The Face of, Suess, 47, 235; framework of, Davis, 48, 225; Origin, Chamberlin, 42, 167, 371.

Earthquake, of 1918 in Porto Rico, 50, 236.

— investigation Committee, Japanese, 42, 84.

East, E. M., Inbreeding and Outbreeding, 49, 385.

Eaton, G. F., Osteological Material from Machu Picchu, 42, 86, 281.

Edinburgh, Mathematical Tracts. Whittaker, 41, 226, 298.

Education Board, General, report, 42, 89.

— Public, in Maryland, 42, 88.

Eggleson, J. W., Eruptive rocks at Cuttingsville, Vermont, 45, 377.

Ehlers, G. M., Heterolasma foersteri from Michigan Niagara, 48, 461.

Eikenberry, W. L., Botany, 50, 78.

Einstein, A., Relativity, 50, 465.

— displacement of solar lines, Grebe and Bachem, 50, 394.

Electric and Magnetic Measurements, Smith, 43, 415.

— discharges in gases. Strutt, 45, 234.

— Oscillations and Electric Waves, Pierce, 49, 303.

— resolution of helium lines, Merton, 47, 385.

Electricity, Pidduck, 42, 79.

— Emission from Hot Bodies, Richardson, 42, 369.

— Practical, Archbold, 43, 249.

Electro-Analysis, Smith, 46, 766.

Electrochemical equivalents, Herzing and Getman, 44, 399.

Electrodes, perforated, experiments with, Aston, 49, 301.

Electrolysis in Chemical Industry, Hale, 47, 135.

Electrolytic Analysis, Gooch and Kobayashi, 43, 391.

Electromagnetism, Oersted's discovery, 1820, Larsen, 50, 466.

Electron, Millikan, 44, 333.

— theory of passivity, Dean, 47, 123; and relativity, Cunningham, 41, 297.

Electrons, in atoms and molecules, Langmuir, 48, 69; motion through gases, Wellisch, 44, 1.

Electrosopes, emanation, Lester, 44, 225.

Electro-titration, Robbins, 41, 246.

Elston, C. M., sulphide sulphur, 42, 155.

Embryological Essays, Assheton, 43, 421.

Embryology, Lillie and Moore, 49, 222; Human, McMurrich, 41, 225.

Emerald deposits of Muzo, Colombia, Pogue, 42, 85.

Emerson, B. K., cylinders of scoraceous diabase, 41, 321; mineralogical notes, 42, 233.

Emery, W. B., igneous geology of Carrizo Mountain, Arizona, 42, 349; Green River desert section, Utah, 46, 551.

Energy, Theories of, Perry, 45, 419.

Engineering Education, Mann, 46, 772.

Engineers Tables, Ferris, 43, 342.

Entelodonts of Marsh Collection, Troxell, 50, 243, 361, 431.

Entomology, Lochhead, 47, 453.

Epsomite, spotted lakes of, Jenkins, 46, 638.

Equidae of North America, Osborn, 46, 770.

Equilibrium and Vertigo, Jones, 48, 79.

Errors and Least Squares, Theory of, Weld, 41, 562.

Erwin, M., Universe and the Atom, 41, 369.

Etchings, beryl, Honess, 43, 223; calcite, etc., Honess, 45, 201.

Ethnology, Amer. Bureau, 47, 452.

Europe, submergence, Schuchert, 43, 35.

Evolution, Cosmical, McLennan, 43, 169; of earth, Barrell, Schuchert, etc., 46, 770; of Life, Osborn, 45, 77; Meaning, Schmucker, 41, 151; in medicine, Adami, 46, 691; of plants and animals, Berry, 49, 207; Theory, Scott, 44, 84.

F

Fabry, Ch., note on paper by, Uhler, 49, 143, 148.

Falk, K. G., Chemical Reactions, 50, 464.

Faraday, Michael, Life of, Crowther, 47, 230.

Farlow, W. G., obituary notice, Thaxter, 49, 87.

Farrington, O. C., Brazilian favas,

41, 355; Characters of Meteorites, 41, 376; Catalogue of North American Meteorites, 41, 223; goyazite, 43, 420.

Fauna. See **GEOLOGY**.

Favas, Brazilian, Farrington, 41, 355.

Fay, H., Quantitative Analysis, 47, 225.

Felidae, Oligocene, Thorpe, 50, 207.

Felty, A. R., dialkylphosphoric acids, etc., 43, 57.

Fenton, C. L., Devonian of Iowa, 48, 355.

Ferguson, H. G., tin deposits, Irish Creek, Virginia, 45, 477.

Ferguson, J. B., melting points of cristobalite and tridymite, 46, 417; ternary system, CaO-MgO-SiO₂, 48, 81; wollastonite and the ternary system, 48, 165; binary system akermanite-gehlenite, 50, 131.

Ferric oxides, hydrated, Posnjak and Merwin, 47, 311.

Ferris, C. E., Tables for Engineers, 47, 309.

Ferris, H. B., Cuzco Indians, 43, 339.

Ferry, E. S., Physics Measurements, 47, 138.

Fertilization, Lillie, 48, 162.

Field, R. M., Middle Ordovician of Pennsylvania, 48, 403.

Field Museum of Natural History, 1915, 43, 88; 1916, 44, 160; 1917, 46, 479; 1918, 47, 451.

Fiji Islands, coral reefs, Andrews, 41, 135; Geology, Foye, 43, 343; 47, 387.

Filters, paper pulp for, 41, 557.

Finch, J. K., Topographic maps, 50, 236.

Finkelstein, L., radioactivity of meteorites, 44, 237.

Finmarken, Paleozoic formations, Holtedahl, 47, 79, 85.

Fish, Sail, from the Virginia Miocene, Berry, 43, 461.

Flame tests, Kiplinger, 49, 442.

Flames, Colored, of high luminosity, Hemmlech, 44, 482.

Flint, G. E., Whole Truth About Alcohol, 48, 247.

Flora. See **GEOLOGY**.

Florida, Comanchean formation, Sellards, 48, 13; Vero, fossil beetles, Wickham, 47, 355; discovery of fossil human remains, Sellards, 42, 1; 47, 358; geological survey, 43, 85; phosphate deposits, Sellards, 41, 299; Matson, 41, 300.

Florissant beds, Coleoptera from, Wickham, 42, 81.

Fluids, mechanics of, Barton, 41, 146.

Fluorescent screens for radioscopy purposes, Roubertie and Nemirovsky, 48, 392.

Foerste, A. F., American Ordovician Lichadidae, 49, 26.

Food Analysis, Winton, 44, 77.

— and Drug Laboratories, Methods in, Schneider, 41, 381.

Foods, Microbiology, Schneider, 50, 172; Poisoning, Jordan, 44, 158.

Foote, H. W., progress of chemistry, 1818-1918, 46, 259.

Footprints, Grand Canyon, Arizona, Lull, 45, 337; Massachusetts Carboniferous, Lull, 50, 234; Pennsylvanian of Oklahoma, Jillson, 44, 56; Glen Rose limestone, Texas, Shuler, 44, 294.

Ford, W. E., hydrozincite, 42, 59; margarosanite, 42, 159; apatite from Auburn, Me., 44, 245; growth of mineralogy, 1818-1918, 46, 240.

— new mineral names, 42, 504; 43, 493; 44, 485; 45, 477; 47, 446.

Formkohle, origin, Stevenson, 43, 211.

Fort, C., Book of the Damned, 49, 304.

Foshag, W. F., sulphohalite, 49, 76; aphthalite (glaserite), California, 49, 367.

Fossil. See **GEOLOGY**.

Fossilium Catalogus, 41, 222, 223.

Foye, W. G., geology of the Lau Islands, Fiji, 43, 343; 47, 387.

France, Science and Learning, 44, 488.

Franklin, W. S., Physics, 43, 168.

Fraps, G. S., Agricultural Chemistry, 44, 159.

Freezing-point lowering, determination, Van Name and Brown, 43, 110.

French, Chemical, Dolt, 45, 417.

Fringes, interference, rotation, Barus, 42, 63.

Funafuti borings, Skeats, 45, 81.

Fundy, Bay of, marine faunas, Kindle, 41, 449.

G

Gager, C. S., Botany, **44**, 85.
 Gale, H. G., Physics, **50**, 394.
 Gallium. See CHEMISTRY.
 Galloway, J. J., rounding of sand by solution, **47**, 270.
 Gas Chemists' Handbook, **43**, 411.
 — field, Hogshooter, Berger, **48**, 189.
 — molecules, condensation, Wood, **43**, 81.
Gases, of Atmosphere, Ramsay, **41**, 557; diffusion of light by, Fabry, **47**, 70; magnetic susceptibilities, Honda and Okubo, **49**, 377; polarization, Strutt, **47**, 137; and vapors, electric discharges, Strutt, **45**, 234.
 Gaskell, W. H., Involuntary Nervous System, **42**, 87.
 Gems, Kunz, **47**, 238; Schaller, **47**, 145; Sterrett, **41**, 223.
 Genetics, Pearl, **41**, 379.
 Geochemistry, Data of, Clarke, **41**, 376.
 Geodes of the Keokuk beds, Van Tuyl, **42**, 34.
 Geografiska Annaler, **49**, 86.
 Geographical Society, Transcontinental Excursion of 1912, **41**, 304.
 Geography, Economic, Dryer, **45**, 484.
 Geologic instruction, Gregory, **47**, 281; Map of Ohio, Bownocker, **50**, 239; Handbook of Northern France, Davis, **45**, 479.

GEOLOGICAL REPORTS.

Alabama, **44**, 158.
 Canada, annual report, 1914, **41**, 467; 1915, **42**, 84; 1916, **46**, 477; publications, **44**, 81; **46**, 477, 547.
 Connecticut, bulletin, no. 22, **44**, 83; 8th biennial report, **47**, 390.
 Florida, 8th annual report, **43**, 85.
 Illinois, bulletins, no. 33, **43**, 490; no. 37, **49**, 383; no. 39, **48**, 78; no. 40, **49**, 383; Year-book, 1910, **41**, 564.
 Iowa, annual report, 1914, **43**, 251; 1915, **45**, 421; bulletin, no. 6, **48**, 77.
 Kentucky, **41**, 374; **47**, 232.
 Maryland, **46**, 768; **50**, 237.
 Minnesota, **49**, 383.
 Mississippi, **41**, 375.
 Missouri, Branson, **47**, 78.
 Nebraska, **43**, 491.

GEOLOGICAL REPORTS.

New Zealand, annual reports, 10th, **43**, 335; 11th, **45**, 423; bulletins, no. 17, **41**, 565; no. 17, **41**, 565; no. 18, **45**, 148; no. 22, **50**, 76; paleontological bulletin no. 4, **45**, 77.
 North Carolina, **48**, 78.
 South Africa, **41**, 564; **45**, 146.
 South Australia, annual report, 1915, **43**, 492; 1916, **45**, 422; bulletins, no. 6, **45**, 147; no. 7, **49**, 384.
 Texas, **41**, 373.
 United States, 36th annual report, **41**, 371; list of publications, **41**, 371; **42**, 440.
 — 37th annual report, **43**, 488; lists of publications, **43**, 418, 489; **44**, 405.
 — 38th annual report, **45**, 421; lists of publications, **45**, 475.
 — 39th annual report, **47**, 140; lists of publications, **47**, 141; **48**, 75, 161, 476.
 — 40th annual report, **49**, 448; list of publications, **49**, 448; **50**, 469.
 Vermont, **43**, 490.
 Virginia, biennial report, 1914-1915, **42**, 82; bulletin no. 14, **45**, 476; no. 15a, **45**, 477; no. 17, **49**, 153; no. 18, **48**, 77; no. 19, **49**, 153.
 West Virginia County reports, **41**, 373; **42**, 503; **43**, 419; **45**, 79; **46**, 769; **49**, 153.
 Western Australia, annual report, 1915, **43**, 252; 1918, **50**, 76; bulletins, nos. 58, 62, 64, 65, **41**, 566; no. 63, **43**, 336; nos. 71, 73-76, **48**, 474; no. 77, **50**, 76.
 Wisconsin, bulletins, no. 42, **41**, 374; nos. 28-32, 37-40, no. 35, no. 40, **41**, 467; no. 36, **42**, 83; no. 47, **48**, 78.
 Geological Society of London, **45**, 478.
 — Surveys, History of Amer. State, Merrill, **50**, 395; U. S. Government, 1818-1918, Smith, **46**, 171.
 Geologie, Handbuch der Regionalen, **41**, 302; **50**, 396.
 Geology, Economic, Ries, **43**, 252, 339; Field, Lahee, **43**, 172; Historical, Miller, **43**, 87.
 — history, 1818-1918, Schuchert,

46, 45; Gregory, 46, 104; Barrell, 46, 133; Lull, 46, 193.
Geology, Physical, Cleland, 42, 282;
 Pirsson, 50, 460.
 — Review of, 48, 247.

GEOLOGY.

Abo sandstone, New Mexico, ammonoids, Böse, 49, 26.
 Agelacrinitid, from New York, Chazy, Clark, 50, 69.
 Albertella fauna, Burling, 42, 469.
 Aletomeryx, Lull, 50, 83.
 Algal deposits. Pre-Cambrian, etc., Twenhofel, 48, 339.
 Algonkian Cambrian boundary in Vermont, Dale, 42, 120.
 Ammonites, American Jurassic. Reeside, 50, 240.
 — Type, Buckman and Dutcher, 50, 468.
 Ammonoids from New Mexico, Böse, 49, 26; Lee, 49, 323; of Texas, Böse, 47, 305.
 Amphibia, Coal Measures of North America, Moodie, 42, 502.
 Amphibian, Eocene, Loomis, 47, 217.
 Arcas, Atlantic Slope, Sheldon, 43, 251.
 Arthropods in Burmese amber, Cockerell, 44, 360.
 Artiodactyl, Oligocene, Troxell, 49, 391; Tertiary, Lull, 50, 83.
 Athabasca Series, Alcock, 50, 25.
 Barrier Reef of Australia, Davis, 44, 339.
 Beatricea, fossil hydroid, Schuchert, 47, 293.
 Berea formation of Ohio, etc., Verwiebe, 42, 43.
 Berkshire schist and Stockbridge limestone, unconformity, Dale, 49, 369.
 Botany, fossil, in the Western World, Guppy, 49, 372.
 Brachiopod shales, Norway, Troedsson, 48, 78.
 Brachiopoda of Antarctic Expedition, Thomson, 48, 397; of Burma, Buckman, 50, 74; of the Girvan District, Reed, 43, 492; Permian, of Armenia, Stoyanow, 42, 439; recent, U. S. Nat. Museum, Dall, 50, 170.

GEOLOGY.

Bryozoa, early Tertiary, Canu and Bassler, 50, 241; fossil, West Indies, Canu and Bassler, 49, 83.
 Burlington limestone, origin of chert, Tarr, 44, 409.
 Butler salt dome, Texas, Powers, 49, 127.
 Cambrian, Algae and Spongiae, Walcott, 50, 239; geology, Walcott, 42, 439; of the Grand Canyon, Schuchert, 45, 362; and Ordovician of Maryland, Bassler, 50, 237; and Pre-Cambrian formations, Montana, Walcott, 42, 372; trails, critical study, Burling, 44, 387; Trilobites, Walcott, 41, 301.
 Carboniferous footprints, Mass., Lull, 50, 234; of the Grand Canyon, Schuchert, 45, 347.
 Cedar Mt. trap ridge near Hartford, Davis, 46, 476.
 Champlain submergence on Maine coast, Meserve, 48, 207.
 Chapman sandstone of Maine, fauna, Williams, 42, 169.
 Cheilostome Bryozoa, Canu and Bassler, 43, 419.
 Cheirurinæ, revision, Barton, 41, 563.
 Cherts, California, Davis, 47, 234; Kansas, Twenhofel, 47, 407; Missouri, formation of, Dean, 45, 411; origin, Tarr, 44, 409; 45, 149; Van Tuyl, 45, 449; radiolarian, in Oregon, Smith, 42, 299, 504.
 Chester series, Kentucky, 47, 232.
 Chilopods and trilobites, ancestry, Tothill, 42, 373.
 Cincinnati fossils, Foerste, 43, 493.
 Coleoptera, new, from the Florissant beds, Wickham, 42, 81.
 Comanchean of Florida, Sellards, 48, 13; Kansas, Twenhofel, 49, 281; Texas, Adkins and Minton, 50, 241.
 Conglomerates, origin, Field, 43, 85.
 Continental fracturing in Oceanica, Schuchert, 42, 91.
 Cooper limestone, Greger, 50, 20.
 Coral-reef. See **Coral Reef**.
 Crab, fossil, Mary J. Rathbun, 41, 344.

GEOLOGY.

Cretaceous age of the "Miocene flora" of Sakhalin, Kryshtofovich, **46**, 502.
 — faunas of New Zealand, Woods, **45**, 78.
 — limestones underlying Florida, Cushman, **47**, 307.
 — lower, Federal Hill, Maryland, Berry, **50**, 48.
 — Tertiary boundary in So. America, Windhausen, **45**, 1.
 — upper, floras of Tennessee, etc., Berry, **50**, 240; of the world, Berry, **42**, 81; Fulgor, Wade, **43**, 293.
Crustacea, Paleozoic, Vogdes, **44**, 336.
Crustaceans, decapod, from Panama, Rathbun, **47**, 234.
Cycadophyta, Wieland, **47**, 391.
Cycadophyte from North American Coal Measures, Bassler, **42**, 21.
Cycads. See **Cycads**.
Cyprinid fish, British Columbia, Hussakoff, **42**, 18.
 Dakota flora, age, Berry, **50**, 387.
 Devonian faunas of MacKenzie River Valley, Kindle, **42**, 246.
 — shales of Ohio and Pennsylvania, correlation, Verwiebe, **44**, 33.
 — of Central Missouri, Greger, **49**, 265; Illinois, Savage, **49**, 169; Iowa, Hackberry stage, Fenton, **48**, 355; Missouri, Greger, **50**, 20; Montana, fauna, Haynes, **41**, 375; Southwest Ontario, Stauffer, **41**, 221; West Tennessee, Dunbar, **46**, 732; **49**, 307.
 Diceratheres, American, Peterson, **50**, 396.
 Dighton conglomerate, Perkins, **49**, 61.
 Dinosaur, Sauropodous, diseased vertebræ, Moodie, **41**, 529.
 — tracks at Glen Rose, Texas, Shuler, **44**, 294; see **Footprints**.
 Dinosauria, Armored, of U. S., Nat. Museum, Gilmore, **47**, 236.
 Dinosaurs, functions of "sacral" brain, Lull, **44**, 471.
 — see **Marsh Collections**.
 Echinodermata of the U. S., Clark and Twitchell, **41**, 221.
 Echinoidea of the Buda limestone, Whitney, **42**, 440; Cre-

GEOLOGY.

taceous and Cenozoic, of the Pacific Coast, Kew, **50**, 468.
 Edgewood limestone of Pike Co., Missouri, Rowley, **41**, 317.
 Entelodonts, Troxell, **50**, 243, 361, 431.
 Eocene insects from the Rocky Mts., Cockerell, **50**, 169.
 — Lower, floras of southeastern North America, Berry, **42**, 438.
 — of the Mississippi embayment, Berry, **41**, 222.
 — Tejon, of California, Dicker- son, **42**, 80.
Equidae, Osborn, **46**, 770.
Esker, Anderson, Reeves, **50**, 65.
Eusthenopteron, Bryant, **50**, 240.
Exogyra in the Texas Cretaceous, Böse, **49**, 84.
 Fauna, amphibian, at Linton, Ohio, Case, **44**, 124; of Chapman sandstone, Williams, **42**, 169; Lower Cambrian, Holmia, Norway, Kier, **44**, 336; Tertiary, of Pacific coast, **45**, 332.
 Fish, Cyprinid from Miocene of British Columbia, Hussakoff, **42**, 18; Palaeoniscid from So. Dakota, Hussakoff, **41**, 347.
 Fish-remains, Cretaceous and Tertiary, New Zealand, **48**, 475.
 Flora, Liassic, of the Mixteca Alta, Wieland, **42**, 370; of the Morrison formation, Knowlton, **49**, 189.
 Floras, Upper Cretaceous, of the World, Berry, **42**, 81.
 Fossil bean, Venezuela, Berry, **50**, 310.
 — Floras of middle Eocene, Georgia, Berry, **43**, 298.
 — footprints from the Grand Canyon, Lull, **45**, 337.
 — fuels, interrelations, Stevenson, **42**, 439.
 — human remains, discovery in Florida, Sellards, **42**, 1; **47**, 358.
 — hydrozoan, from Japan, Hayasaka, **44**, 338.
 — shells in Boston basin, Morse, **49**, 157.
 Fossils, American, Index to, Bassler, **41**, 148.
 — from Miura, Japan, Yokoyama, **50**, 241.
 Fulgor, Upper Cretaceous, Wade, **43**, 293.

GEOLOGY.

Gastropoda. Tennessee, Wade, **45**, 78, 334.
 Geologic section of Pennsylvania, Butts, **46**, 523.
 Glaciation. See *Glaciation*.
 Glaciers. See *Glaciers*.
 Green River desert section, Utah, Emery, **46**, 551.
 Hackberry stage of the Devonian of Iowa, Fenton, **48**, 355.
 Headwaters divide of Right Middle Creek, Kentucky, Jillson, **47**, 60.
 Heterolasma foersti from Michigan, Ehlers, **48**, 461.
 Hillsboro sandstone, stratigraphic position, Prosser, **41**, 435.
 Homalonotus, Reed, **46**, 771.
 Hymenæa, Cretaceous from Alabama, Berry, **47**, 65.
 Hymenoptera, fossil parasitic, Cockerell, **47**, 376.
 Hypisodus alacer, Troxell, **49**, 391.
 Insects, ancestry of, Tothill, **42**, 373; in Burmese amber, Cockerell, **42**, 135, **44**, 360; from Coal Measures of France, Bolton, **45**, 78; Eocene, Cockerell, **50**, 169.
 — Triassic, of Australia, **47**, 307.
 Isopod, fossil, Chilton, **47**, 307.
 Isostasy. See *Isostasy*.
 Jurasic, American, ammonites, Reeside, **50**, 240; Fauna, Cuba, Roig, **50**, 237.
 Keokuk beds, geodes of, Van Tuyl, **42**, 34.
 Labyrinthodont, new, Pennsylvania Triassic, Sinclair, **43**, 319.
 Lava. See *Lava*.
 Lichads, Amer. Ordovician, generic relations, Foerste, **49**, 26.
 Ligamentum teres in Nebraska Proboscidea, Barbour, **41**, 251.
 Lignite, age of Brandon, Berry, **47**, 211.
 Limestone, Niagara, Rochester, brecciation in, Giles, **47**, 349.
 Lopolith, Grout, **46**, 516.
 Manzano group, New Mexico, Lee, **49**, 323.
 Marine faunas, bottom control, Kindle, **41**, 449; invertebrates, analysis, Clarke and Wheeler, **43**, 419.
 Mastodon, So. Carolina, Loomis, **45**, 438.

GEOLOGY.

Mesozoic physiography of Rocky Mts., Lee, **47**, 78.
 Miocene boulders, fossiliferous, Block Island, Shimer, **41**, 255.
 Mississippian of Kentucky, Butts, **47**, 232; of Ohio, etc., correlation of, Verwiebe, **43**, 301.
 Mollusks, Bivalve, of the Northwest Coast of America, Dall, **42**, 439.
 Morrison formation, Mook, **43**, 85; Colorado, Knowlton, **49**, 189; Lee, **49**, 183.
 Morrow group of Arkansas fauna, Mather, **41**, 375.
 Mountains, block, in New Zealand, Cotton, **44**, 249; **45**, 149.
 Mysticocrinus, Springer, **46**, 666.
 Naiades of Pennsylvania, Ortmann, **50**, 242.
 Neocalamites, Berry, **45**, 445.
 Neocomian of Argentina, Windhausen, **47**, 303.
 Neogene deposits in Venetia, Stefanini, **44**, 299.
 Nutmeg, fossil, from Texas, Berry, **42**, 241.
 Oligocene camel, Troxell, **43**, 381; of Chehalis Valley, paleontology, Van Winkle, **45**, 334; Felidae, Thorpe, **50**, 207.
 Onaping map area, Collins, **46**, 547.
 Ordovician, Indiana, McEwan, **50**, 154.—
 — Lichads, generic relations, Foerste, **49**, 26.
 — Middle of Pennsylvania, Field, **48**, 403.
 — strata of the Baltic basin, Raymond, **42**, 437.
 — Upper, formations in Canada, Foerste, **42**, 438.
 — and Silurian brachiopods, Girvan district, Reed, **43**, 493; Fossils, Index to American, Bassler, **41**, 148.
 Organic remains in iron-bearing Huronian rocks in Minnesota, Grout and Broderick, **48**, 199.
 Orthophragmina, etc., American species, Cushman, **50**, 468.
 Osteological material from Machu Picchu, Eaton, **42**, 86.
 Paleogeography, Paleozoic, in the Arctic, Holtedahl, **49**, 1, 308.

GEOLOGY.

Paleontologic Contributions, Ruedemann, **43**, 337.
 Paleontology, present tendencies, Berry, **48**, I.
 Paleozoic crustal instability in No. Amer., Schuchert, **50**, 399.
 — formations of Finmarken, Holtedahl, **47**, 79, 85.
 — of Lake Timiskaming, Hume, **50**, 293.
 Palm, from Cretaceous of New Jersey, Berry, **41**, 193.
 Parasuchian from the Triassic of Pennsylvania, Sinclair, **45**, 457.
 Pebbles, unusual method of rounding, in West Australia, Jutson, **48**, 429.
 Pectinidæ of Texas, Kniker, **47**, 234.
 Pelecypoda, Harris, **48**, 398.
 Pelecypods, new, Cretaceous, No. Alberta, McLearn, **49**, 83.
 Pennsylvanian of Kansas, granite boulders in, Twenhofel, **43**, 363; series in Missouri, Hinds and Greene, **41**, 222.
 Perisphinctinæ, orthogenetic development of the costæ, O'Connell, **48**, 450.
 Permian in Trans-Pecos, Texas, **47**, 79.
 Permo-Carboniferous red beds of No. America, Case, **41**, 219.
 Phosphates, Florida, Sellards, **41**, 299; Matson, **41**, 300.
 Plants, fossil, see **Plants**.
 Pleistocene deposits, age of, Hay, **47**, 361.
 — Mt. Desert Island, Blaney and Loomis, **42**, 399.
 — period, life of, Baker, **50**, 170.
 — submergence in New York, Fairchild, **50**, 238.
 Pliocene history of Mississippi, Shaw, **46**, 547.
 Pliohippus lullianus, Troxell, **42**, 335.
 Portage fauna in the Mackenzie River Valley, Kindle, **49**, 84.
 Potomac formation, coniferous woods, Sinnott and Bartlett, **41**, 276.
 Pottsville formations and faunas of Arkansas, etc., Mather, **43**, 133.
 Pre-Cambrian, Adirondack, Aliling, **48**, 47.

GEOLOGY.

Pre-Cambrian era, Lawson's correlation, Lane, **43**, 42.
 — nomenclature, Schuchert, **42**, 475.
 — and Carboniferous algal deposits, Twenhofel, **48**, 339.
 Protichnites and Climactichnites, Burling, **44**, 387.
 Pseudorthoceras knoxense, Girty, **42**, 387.
 Quaternary geology of Wisconsin, Alden, **47**, 143.
 Rensselærina, new genus, Dunbar, **43**, 467.
 Ripples and related surface forms, Bucher, **47**, 149, 241.
 Rock tanks and charcos, Bryan, **50**, 188.
 Sail fish from the Virginia Miocene, Berry, **43**, 461.
 Sand grains, rounding of, Gallo-way, **47**, 270; Kindle, **47**, 431.
 San-Jorge formation in Patagonia, Windhausen, **45**, I.
 San Lorenzo series of middle California, Clark, **46**, 769.
 Scranton coal, Colorado, age of, Richardson, **43**, 243; list of fossils, Knowlton, **43**, 243.
 Scyphocrinus, Springer, **44**, 337.
 Sheet-flows, Niagara district, West Australia, Jutson, **48**, 435.
 Shells, fossil in Boston basin, Morse, **49**, 157.
 Silicispongiaæ, Cretaceous, O'Connell, **49**, 152.
 Silurian geology of Ontario Peninsula, Williams, **49**, 83; rocks of No. Michigan, Savage and Crooks, **45**, 59; strata of Estonia, Russia, Twenhofel, **42**, 437.
 Stegosaurus, stenops, Gilmore, **47**, 236.
 Stone Age, men of, Osborn, **41**, 217.
 Strata, determination of depth and thickness, Palmer, **47**, 236.
 Strophomenidae of the Kristiania region, Holtedahl, **41**, 562.
 Stylemys nebrascensis, Case, **47**, 435.
 Taconic system resurrected, Schuchert, **47**, 113.
 Tejon Eocene of California, Dickerson, **42**, 80.
 Terebratulas, Swedish, Hadding, **49**, 307.

GEOLOGY.

Terraces, marine, in southeastern Connecticut, Hatch, **44**, 319.
 Tertiary faunal horizons of Washington, Weaver, **42**, 81.
 — formations of Washington, Weaver, **43**, 337; of Porto Rico, Maury, **48**, 209.
 — Mammalian faunas of the Mohave Desert, Merriam, **48**, 399.
Tetrabelodon osborni, new, Barber, **41**, 522.
Tetracentron-Drimys question, Wieland, **49**, 382.
Tetra-coralla from the Niagaran of Michigan, Ehlers, **48**, 461; and **Hexacoralla**, Robinson, **43**, 337.
 Texas, Llano Estacado, water of, Baker, **41**, 373.
Ticholeptus rusticus, etc., Loomis, **50**, 281.
 Timiskaming County, Quebec, Wilson, **46**, 547.
 — Lake, Paleozoic, Hume, **50**, 293.
 Tomistoma americana, Sellards, **42**, 235.
 Tortoise, new, Sellards, **42**, 235.
 Trias of New Zealand, Trechman, **47**, 445.
 Triassic life of the Connecticut Valley, Lull, **41**, 147.
 — and Jurassic, Idaho, Mansfield, **50**, 53.
Trilobites. See **Trilobites**.
 Tumularia, Paleozoic alcyonarian, Robinson, **42**, 162.
 Tunicates from Sicily, Jackel, **49**, 305.
 Venus mercenaria in Boston basin till, Morse, **49**, 57.
 Vermejo and Raton floras, Knowlton, **47**, 74.
 Vertebrate footprints, Oklahoma, Jillson, **44**, 56.
 — life in the late Paleozoic in No. America, Case, **49**, 306.
 Wasatch and Salt Lake formations, Mansfield, **49**, 399.
Geophysical laboratory, Washington, work of, Sosman, **46**, 255.
 — — papers from. See **Ferguson, Larsen, Merwin, Rankin, Washington, White, Wyckoff, et al.**
 — observations at Burrinjuck, N. S. W., Cotton, **43**, 170.

Getman, F. H., electrochemical equivalents, **44**, 399; Chemistry, **46**, 765.
Gilbert, G. K., obituary notice, Davis, **46**, 669.
Giles, A. W., brecciation in Niagara limestone, Rochester, N. Y., **47**, 349.
Gill, H. E., phosgenite, **47**, 430.
Gilmore, C. W., Armored Dinosauria of U. S. Nat. Museum, **47**, 236.
Giltner, W., microbiology, **42**, 87.
Girty, G. H., apical end of *Pseudorthoceras knoxense*, **42**, 387.
Glacial, control theory of coral reefs, Daly, **41**, 175; **48**, 136.
 — modification of drainage, New York, Hausman, **45**, 153.
 — period, life, Baker, **50**, 170.
 — till, Boston basin, shells in, Morse, **49**, 157.
Glaciation, Cuzco, Peru, Gregory, **41**, 39; Paleozoic, Alaska, Kirk, **46**, 511; Pennsylvania, Williams, **44**, 83.
Glasgow University, geological publications, **42**, 503; **45**, 334.
Glass Mts., Texas, geology, Uden, **47**, 387.
Gleditsch, E., life of radium, **41**, 112.
Glenn, M. L., melanterite and chalcanthite groups, **50**, 225.
Goff, E. S., Plant Culture, **42**, 284.
Gold deposition in the Bendigo gold field, Stillwell, **47**, 388.
Goldschmidt, V., Atlas der Krystallformen, **50**, 397; Krystallographie und Mineralogie, Beiträge, **50**, 398.
Gooch, F. A., Quantitative Analysis, **41**, 294; electrolytic analysis, **43**, 391; platinized anode of glass in the electrolytic determination of manganese, **44**, 53; perchlorate method for determination of alkali metals, **44**, 381; determination of thorium, **45**, 227; of fluorine, **45**, 370; determination of vanadic acid, **46**, 427; barium and strontium, separation, **46**, 538.
Goodale, G. L., development of botany since 1818, **46**, 399.
Grabau, A. W., Geology of Non-Metallic Mineral Deposits, **50**, 468.

Grand Canyon, Cambrian, Schuchert, 45, 362; Carboniferous, Schuchert, 45, 347; fossil footprints, Lull, 45, 337; Story of, Darton, 44, 158.

Granite boulders of Kansas, Twenhofel, 43, 363; 48, 132; Powers, 44, 146.
— see **Rocks**.

Gravitation, possible limit to, Very, 48, 33.
— and relativity, Woolard, 45, 425.
— and Isostasy, Bowie, 43, 249.

Greger, D. K., Devonian of Central Missouri, 49, 265; 50, 20.

Gregory, H. E., geology of the Cuzco Valley, Peru, 41, 1; geology of the Navajo Country, 45, 145; progress in interpretation of land forms, 46, 104; co-operation in geologic instruction, 47, 281.

GROUT, F. F., lopolith, 46, 516; organic remains in iron-bearing Huronian rocks in Minnesota, 48, 199.

Gruenberg, B. C., Biology, 48, 477; 49, 84.

Guppy, H. B., fossil botany in America, 49, 372.

H

HaaS, P., Chemistry of Plant Products, 45, 242.

Hackh, I. W. D., modification of the periodic table, 46, 481.

Hague, Arnold, biographical notice, Diller, 44, 73.

Hale, A. J., Electrolysis in Chemical Industry, 47, 135.

Hale, G. E., National Academies, 41, 225.

Hale, W. J., Chemistry, 44, 399.

Hall, W. T., Chemistry, 42, 74.

Hamor, W. A., phosgenite, 47, 430.

Hanna, G. D., Geological Notes on Pribilof Islands, 48, 216.

Hare, Robert, Life of, Smith, 44, 76.

Harper, L. F., uplift on coast of New South Wales, 44, 48.

Harris, G. D., Pelecypoda, 48, 398.

Harshberger, J. W., Mycology and Plant Pathology, 45, 335.

Harvey, E. N., Animal Light, 50, 474.

Hatch, L., marine terraces in Southeastern Connecticut, 44, 319.

Hatschek, E., Chemistry of Colloids, 41, 368; 48, 160; 50, 73; forms assumed by drops and vortices, 47, 383.

Hausman, L. A., glacial modification of drainage within a narrow area, 45, 153.

Haüy, Abbé, 45, 326.

Hawaii, Bishop Museum, 49, 156.
— lava from Mauna Loa, 1916, Jaggar, 43, 255.
— petrology, Powers, 50, 256.
— selensulphur, Brown, 42, 132.
— see **Kilauea, Mauna Loa, Mo-kauweoweo**.

Hawk, P. B., Physiological Chemistry, 42, 76; 47, 148.

Hawkins, A. C., geology of Rhode Island, 46, 437; 47, 308.

Hay, O. P., relative ages of Pleistocene deposits, 47, 361.

Hazard, D. C., Magnetic Tables and Charts for 1915, 45, 236.

Hearl, Starling, 45, 424.

Heat of formation by combustions with sodium peroxide, Mixter, 43, 27; specific, of silicates, White, 47, 1; at higher temperatures, White, 47, 44.

Hébert (1857) on periodic submergence of Europe, Schuchert, 43, 35.

Hedrick, E. R., Logarithmic Tables, 50, 467.

Hegner, R. W., Zoology, 41, 150.

Helium, hydrogen and mercury, ultra-violet spectra, Richardson and Bazzoni, 45, 73.
— lines, broadening of, Merton, 47, 385; in the ultra-violet, Lyman, 49, 81.

Helvetica, Chimica Acta, 46, 480.

Henderson, Chemistry, 45, 233.

Henderson, W. D., Physics, 42, 500.

Hering, C., electrochemical equivalents, 44, 399.

Herrick, C. J., Neurology, 45, 485.

Herrick, F. H., Audubon, the Naturalist, 45, 150.

Herschel, Macpherson, 50, 395.

Hess, F. L., tactite, product of contact metamorphism, 48, 377.

Hildebrand, J. H., Chemistry, 46, 614.

Hill, D. W., solution of metals in ferric salts, 42, 301; solution of silver in chromic acid, 45, 54.

Hill, T. G., Chemistry in Plant Products, 45, 242.

Hillebrand, W. F., Analysis of Silicate and Carbonate Rocks, 49, 78.

Hillsboro sandstone, Prosser, 41, 435.

Himalayas, structure of, Oldham, 45, 76.

Hindu Achievements in Science, Sarkar, 47, 230.

Hogshooter gas sand, Berger, 48, 189.

Holleman, A. F., Inorganic Chemistry, 43, 80.

Holm, T., Studies in the Cyperaceæ, no. XXVII, 48, 17; no. XXVIII, 49, 195; no. XXIX, 49, 429; no. XXX, 50, 159.

Holmes, S. J., Animal Biology, 47, 309.

Holtedahl, O., Paleozoic formations of Finmarken, 47, 79, 85; Paleozoic paleogeography in the Arctic, 49, 1, 308.

Hommel, W., Petrography, 50, 75.

Honess, A. P., etching figures of beryl, 43, 223; etching figures of the dihexagonal alternating type, 45, 201.

Hood, G. W., Horticulture, 41, 381.

Hooker, Sir Joseph D., Life by F. O. Bower, 50, 78.

Hopewell-Smith, A., Histology of the Mouth, 46, 480; 47, 148.

Horse, early Pliocene one-toed, Troxell, 42, 335.

Hough, G. J., cocinerite, 48, 206.

Houston, R. A., Theory of Color Vision, 42, 433.

Huff, W. J., estimation of phosphorous, etc., acids in mixture, 45, 91; hydrolysis, etc., of hypophosphoric acid, 45, 103; preparation of hypophosphates, 46, 587.

Hulett, G. A., water content of coal, 43, 89; moisture content of typical coals, 45, 174.

Human Body, McMurrich, 41, 225.

— remains, fossil, in Florida, Sellards, 42, 1; 47, 358.

— Skeleton, Walter, 47, 81.

Hume, G. S., Paleozoic outlier of Lake Timiskaming, 50, 293.

Hunt, W. F., melanochalcite, 41, 211.

Huntington, E., World Power and Evolution, 48, 396.

Huronian, Minnesota, organic structures in, Grout and Broderick, 48, 199.

Hussakof, L., Palaeoniscid fish from South Dakota, 41, 347; new Cyprinid fish from British Columbia, 42, 18.

Huxley, T. H., Physiology, 41, 151.

Hydrogen, oxygen, etc., molecules of, Silberstein, 43, 330.

— spectra, Stark, 41, 465. See CHEMISTRY.

Hyman, L. H., Zoology, 49, 84.

I

Ichikawa, S., Japanese minerals, 42, 111; 44, 63; 48, 124.

Idaho, phosphate field, Mansfield, 50, 53; Wasatch and Salt Lake formations, Mansfield, 49, 399.

Iddings, J. P., densities of igneous rocks, 49, 363.

— obituary, 50, 316.

Illinois Coal, Parr, 41, 225.

— Devonian, Savage, 49, 169.

— geol. survey. See GEOL. REPORTS.

— waters of, chemical survey, 44, 160.

Inbreeding and Outbreeding, East and Jones, 49, 385.

Index, Book Review, 49, 226.

— Industrial Arts, 49, 455.

India, Board of Scientific Advice report 1914-1915, 42, 284; 1915-1916, 45, 239; 1916-1917, 47, 240; 1917-1918, 49, 388; 1918-1919, 50, 81.

— Geology, Wadia, 49, 219.

— See Hindu.

Indices, refractive, new method of determining, 42, 498.

Induction, unipolar, Kennard, 43, 332.

Industrial Arts Index, 49, 455.

Insects, Connecticut, Viereck, 44, 83. See GEOLOGY.

Insurance and Annuities for Teachers, Pritchett, 42, 169.

Interference of reversed spectra, Barus, 41, 414; 42, 63, 402; 43, 145.

Invertebrate Types, Morphology of, Petrunkevitch, 43, 421.

Ionium from uraninite, Gleditsch, 41, 115.

Ionization of acids, Drushel and Felty, **43**, 57.
 — of iodide solutions, Van Name and Brown, **44**, 453.

Ions and electrons, motion of through gases, Wellisch, **44**, 1.
 — and Ionizing Radiations, Crowther, **49**, 381.
 — recombination by X-rays, Jauncey, **42**, 146.

Iowa, Devonian of, Hackberry stage, Fenton, **48**, 355.
 — geol. survey. See **GEOL. REPORTS**.

Iron ore in Wisconsin, Savage and Ross, **41**, 187.

Isostasy, mathematics, Chamberlin, **49**, 311; MacMillan, **49**, 318.
 — nature and bearings, **48**, 281; status of theory, Barrell, **48**, 291.
 — and coral reef problem, Molengraaf, **44**, 153.
 — and gravity, Bowie, **43**, 249.
 — and the planetesimal theory, Chamberlin, **42**, 371.

Isostatic compensation, distribution of, Bowie, **43**, 471.

Isotopes, spectra, Merton, **49**, 80; melting points, **50**, 314.

Isotopic lead, Clarke, **46**, 764; Richards, **47**, 224; separation, Richards and Hall, **43**, 409.

J

Jacoby, H., Navigation, **45**, 74.

Jaggar, T. A., lava flow from Mauna Loa, 1916, **43**, 255; volcanologic investigations at Kilauea, **44**, 161.

Jamieson, G. S., double salts of caesium chloride, **43**, 67; hydrogen peroxide determination, **44**, 150.

Japan, minerals from, Ichikawa, **42**, 111; **44**, 63; **48**, 124.
 — Operculina, Yabe, **47**, 80.
 — Ophiuroidea, **44**, 404.
 — Tarumai dome, Simotomai, **44**, 87.
 — Sakura-jima Eruptions, 1914, **43**, 338.

Japanese Earthquake Commission, **42**, 84.

Jauncey, G. E. M., effect of magnetic field on recombination of ions by X-rays, **42**, 146.

Jeans, J. H., Cosmogony, **49**, 150.

Jeffrey, E. C., Anatomy of Woody Plants, **45**, 152.

Jenkins, O. P., spotted lakes of epsomite, **46**, 638.

Jewels and Charms, Kunz, **41**, 224.

Jillson, W. R., vertebrate footprints in Oklahoma, **44**, 56; recent eruption of Mt. St. Helens, Wash., **44**, 59; migration of headwaters divide of Right Middle Creek, Kentucky, **47**, 60.

Jobling, E., Catalysis, **41**, 368.

John Crerar, Library, bibliographical publications, **41**, 379.

Johnson, C. N., Teeth, **46**, 772.

Johnson, D. W., Shore Processes, **48**, 395.

Johnston, J., forms of calcium carbonate, **41**, 473.

Johnstone, J. H. L., relative activity of radium and uranium, **50**, 1.

Jointing, a factor in degradation of lithosphere, Ehrenfeld, **42**, 168.

Jones, D. F., Inbreeding and Outbreeding, **49**, 385.

Jones, H. C., Nature of Solution, **44**, 78.

Jones, I. H., Equilibrium and Vertigo, **48**, 79.

Jones, T. J., Negro Education, **44**, 487.

Jonson, E., law of dissipation of motion, **46**, 578.

Joplin, Mo., zinc and lead deposits, Siebenthal, **41**, 375.

Jordan, E. O., Food Poisoning, **44**, 158.

Journal de Physique, **50**, 395.

Jutson, J. T., rounding of pebbles in sub-arid West Australia, **48**, 429; sheet-flows in the Niagara district in West Australia, **48**, 435.

K

Kansas, Comanchean and Dakota strata, Twenhofel, **49**, 281.
 — granite in, Powers, **44**, 146; Twenhofel, **43**, 363; **48**, 132.

Katmai, Alaska, volcanic emanations, Shipley, **50**, 141.

Kelp, free carbon monoxide in, Langdon, **43**, 165.

Kempson, E. W. E., Electricity and Magnetism, **41**, 146.

Kentucky, formations of Chester series, Ulrich, **47**, 232.

Kentucky geology, Miller, 49, 219; Jefferson Co., Butts, 41, 374; — migration of headwaters divide of Right Middle Creek, Jillson, 47, 60. — Mississippian formations, Butts, 47, 232. — oil and gas resources, Jillson, 49, 152. **Keokuk** geodes, Van Tuyl, 42, 34. **Keyes, C.**, rotating straticulate spheroid, 47, 108. **Kilauea**, changes of level of lava, Jaggar, 43, 255; cyclical variations in eruption, Wood, 45, 146; explosive ejectamenta, Powers, 41, 227; volcanologic investigations, Jaggar, 44, 161. **Kindle, E. M.**, bottom marine faunas of Bay of Fundy, 41, 449; Devonian faunas of the MacKenzie River Valley, 42, 246; rounding of sand grains, 47, 431. **Kinetic theory**, cosine law, Knudsen, 43, 83. **Kingsbury, J. E.**, Telephone, 41, 297. **Kingsley, J. S.**, Comparative Anatomy of Vertebrates, 45, 240. **Kirk, E.**, Paleozoic glaciation in Alaska, 46, 511. **Knight, C. W.**, euxenite in Ontario, 44, 243; Nickel Deposits, 45, 239. **Knowlton, F. H.**, flora of the Morrison formation, Colo., 49, 189. **Kobayashi, M.**, electrolytic analysis, 43, 391; platinized anode in determination of manganese, 44, 53; determination of thorium, 45, 227; of fluorine, 45, 370. **Kozu, S.**, augite from Stromboli, 45, 463. **Kraemer, H.**, Pharmacognosy, 41, 380. **Kraus, E. H.**, melanochalcite, 41, 211. **Krogh, A.**, Respiratory Exchange of Animals and Man, 43, 422. **Kryshtofovich, A. N.**, Cretaceous age of the "Miocene flora" of Sakhalin, 46, 502. **Krystallformen**, Atlas der, Goldschmidt, 50, 397. **Krystallographie**, Zeitschrift, 50, 472. **Kunz, G. F.**, Magic of Jewels and Charms, 41, 224; Rings, 43, 339; Precious Stones in 1917, 47, 238; and Platinum in 1919, 50, 471.

L

Laboratory Manual, Clark, 45, 420. **Lahee, F. H.**, Field Geology, 43, 172. **Lake Iroquois**, etc., Coleman, 44, 351, 487. **Lake Timiskaming**, Paleozoic outlier, Hume, 50, 293. **Lambert projection**, 48, 164. **Lamellibranchs**, living, of New England, Morse, 45, 477. **Lane, A. C.**, Lawson's correlation of the Pre-Cambrian era, 43, 42. **Laney, F. B.**, geology of the Virginina district of Virginia, 45, 476. **Lankester, Sir R.**, Diversions of a Naturalist, 41, 151. **Larsen, A.**, Oersted's discovery of Electro-magnetism, 1820, 50, 466. **Larsen, E. S.**, sulphatic cancrinite from Colorado, 42, 332; optical character of sulphatic cancrinite, 43, 420; eakelite, 43, 464; — melanterite and chalcanthite groups, 50, 225. **Larue, G. R.**, Animal Biology, 50, 76. **Lau Islands**, see Fiji. **Lava** eruption of Stromboli, 1915, Perret, 42, 443; flow from Mauna Loa, 1916, Jaggar, 43, 255; Morro Hill, Calif., Waring, 44, 98. — See ROCKS. **Law** of error, genesis, Sampson, 47, 226. **Lawson**. See Lane. **Lead**, radioactive, 43, 166. — See CHEMISTRY. **Least Squares**, Theory, Weld, 41, 562. **Lecat, M.**, Azeotropism, 49, 217; Pensées sur la Science, etc., 49, 218. **Lecithin**, Maclean, 46, 549. **Lee, J.**, Telegraphy, 45, 237. **Lee, T. H.**, two new zircon minerals, 47, 126; ferrazite, 48, 353. **Lee, W. T.**, Morrison formation, Colorado, 49, 183; Manzano group, New Mexico, 49, 323. **Lenses**, axial aberrations, Tillyer and Shultz, 45, 474. **Lepper, G. H.**, Nebula to Nebula, 47, 386. **Les Bas, G.**, Molecular Volumes, 41, 294. **Lester, O. C.**, emanation electroscopes, 44, 225; radioactive mineral springs of Colorado, 46, 621.

Lewis, J. V., Mineralogy, 41, 149.
 Lewis, W. C. McC., Physical Chemistry, 42, 75; 48, 160.
 Lewis, W. K., Industrial Chemistry, 42, 165.
 Library of Congress, report, 1915, 41, 379; 1917, 45, 150; 1918, 47, 150; 1918, 47, 147; 1919, 49, 309.
 Licks, H. E., Mathematics, 43, 415.
 Life, Chemical Sign of, Tashiro, 44, 84.
 — Origin and Evolution, Osborn, 45, 77.
 Light, Animal, Harvey, 50, 474.
 — diffusion by gases, Fabry, 47, 70.
 — Electromagnetic Theory, Silberstein, 47, 140.
 — polarization by gases, Strutt, 47, 137.
 — rays, signalling by, Wood, 49, 214.
 — scattering by dust free air, Strutt, 46, 615; by solids, Strutt, 48, 392.
 Lightning, ball, Mathias, 43, 248.
 Lillie, F. R., Fertilization, 48, 162; Embryology, 49, 222.
 Lipari, rhyolites, Washington, 50, 446.
 Lockhart, L. B., American Lubricants, 45, 418.
 Lochhead, W., Entomology, 47, 453.
 Loeb, J., Forced Movements, Animal Conduct, etc., 47, 81.
 Logarithmic, Tables, Hedrick, 50, 467.
 Lombard, R. H., determination of dissociation pressures of sulphides, 43, 175.
 Long, Eleanor T., formation of salt crystals, 43, 289.
 Loomis, F. B., Pleistocene locality on Mt. Desert Island, 42, 399; an unusual mastodon, 45, 438; Eocene amphibian, 47, 217; *Ticholeptus rusticus* and the Oreadonts, 50, 281.
 Loughlin, G. F., crandallite, 43, 69.
 Lubricants, American, Lockhart, 45, 418.
 Lull, R. S., Triassic life of the Connecticut Valley, 41, 147; functions of the "sacral" brain in Dinosaurs, 44, 471; fossil footprints from the Grand Canyon, 45, 337; development of vertebrate Paleontology, 46, 193; obituary notice of S. W. Willist-
 ton, 47, 220; new Tertiary Artiodactyls, 50, 83; Carboniferous footprints, Mass., 50, 234.

M

MacCurdy, J. T., War Neuroses, 47, 147.
 Mack, E., moisture content of coal, 43, 89; 45, 174.
 Mackenzie River Basin, Camsell and Malcolm, 49, 451; Valley Devonian, Kindle, 42, 246.
 Maclean, H., Lecithin and Allied Substances, 46, 549.
 MacMillan, W. D., mathematics of isostasy, 49, 311.
 MacNutt, B., Physics, 43, 168.
 Macpherson, H., Herschel, 50, 395.
 Madagascar, minerals, 43, 174.
 Magnesium, single-line radiation, McLennan, 42, 78.
 Magnetic declination in the U. S., Jan. 1, 1915, Hazard, 41, 466.
 — field, effect on recombination of ions produced by X-rays, Jauncey, 42, 146.
 — susceptibilities of gases, Honda and Okubo, 49, 377.
 — Tables and Charts for 1915, Hazard, 45, 236.
 Magnetism, and Electricity, Kempson, 41, 146.
 — Theory of, Gans, 41, 464.
 Mahin, E. G., Quantitative Analysis, 47, 440.
 Maine, Champlain submergence, Meserve, 48, 207; Pleistocene, Blaney and Loomis, 42, 399.
 Man, fossil remains, Vero, Florida, Sellards, 42, 1; 47, 358.
 Manganese minerals, San José, Calif., Rogers, 48, 443.
 Mann, C. R., Engineering Education, 46, 772.
 Mansfield, G. R., western phosphates of the U. S., 46, 591; Wasatch and Salt Lake formations of Idaho, 49, 399; Triassic and Jurassic in Idaho, 50, 53.
 Maps, Topographic, Finch, 50, 236.
 Margerie, translation of Suess, 47, 235.
 Marsh Collections of vertebrates, Lull, 50, 83; Thorpe, 50, 207; Troxell, 49, 391; 50, 243, 361, 431.
 Marshall, C. E., Microbiology, 43, 421.

Maryland Educational Survey Commission, report, 42, 88.
— geological survey. See **GEOL. REPORTS.**

Masius, M., Physics, 44, 404.

Mastodon, new longirostral, Barbour, 41, 524; So. Carolina, Loomis, 45, 438.

Materia Medica, Sayre, 44, 86.

Mathematical Analysis, Whittaker and Watson, 41, 297; Literature, Miller, 41, 369; Tracts, Edinburgh, Whittaker, 41, 226, 298.

Mathematicians, International Congress, 50, 79.

Mathematics, Licks, 43, 415.
— for Agriculture, Kenyon and Lovitt, 45, 144.

Mather, K. F., Pottsville formations and faunas, 43, 133.

Matson, Florida phosphates, 41, 300.

Matsumoto, H., Japanese Ophiuroidea, 44, 404.

Matter, Life of, Turnbull, 49, 221.
— and Electricity, Comstock and Troldan, 43, 414.
— and Energy, Crehore, 45, 76.

Mauna Loa, 1914 eruption, Wood, 41, 383; 1916, lava flow, Jaggar, 43, 255.

Maury, C. J., calcium carbonate concretionary growth, 44, 369;
. Porto Rican Tertiary formations, 48, 209.

Maxted, E. B., Catalytic Hydrogenation, 47, 441.

McDonnell, C. C., lead-chlor arsenate, 42, 139.

McEwan, E. D., Ordovician of Indiana, 50, 154.

McLaughlin, H. M., Qualitative Analysis, 48, 469.

McLearn, F. H., Silurian Arisaig series of Nova Scotia, 45, 126.

McLennan, E., Cosmical Evolution, 43, 169.

McMurrich, J. P., Human Embryology, 41, 225.

McPherson, Chemistry, 45, 233.

Meade, R. K., Chemists' Manual, 45, 416.

Means, A. H., Utah Minerals, 41, 123.

Meany, E. S., Mt. Rainier, 43, 417.

Measurements, Theory, Tuttle, 44, 79.

Mechanics of Fluids, Barton, 41, 146.

Melanterite and chalcocite mineral groups, Larsen, Glenn, 50, 225.

Mellor, J. W., Inorganic Chemistry, 46, 541.

Men of the Old Stone Age, Osborn, 41, 217.

Mendelism, Punnett, 49, 384.

Merriam, J. C., mammalian fauna of the Mohave Desert, 48, 399.

Merrill, G. P., catalogue of meteorites in U. S. Nat. Museum, 42, 283; calcium phosphate in meteoric stones, 43, 322; Florida meteorite, 45, 64; History of American State Geol. Surveys, 50, 395.

Merwin, H. E., forms of calcium carbonate, 41, 473; interpolations on spectrograms, 43, 49; ternary system, $MgO-Al_2O_3-SiO_2$, 45, 301; melting points of cristobalite and tridymite, 46, 417; hydrated ferric oxides, 47, 311; ternary system, $CaO-MgO-SiO_2$, 48, 81; wollastonite and the ternary system, 48, 165.

Meserve, P. W., Champlain submergence on Maine Coast, 48, 207.

Metallurgists Handbook, Liddell, 41, 558.

Metallurgy, Thum, 47, 298.

Metals, Chemical Combinations, Giua and Robinson, 46, 689.

— Physical Chemistry, Schenck and Dean, 49, 147.

Meteoric Stones, calcium phosphate in, Merrill, 43, 322.

Meteorite iron, from Tertiary Deposits, 47, 449; stone, Eustis, Florida, Merrill, 45, 64.

Meteorites of No. America, Catalogue, Farrington, 41, 223.
— Catalogue of, in U. S. National Museum, Merrill, 42, 283.
— radioactivity, Quirke and Finkelstein, 44, 237; 45, 144.
— structure, etc., Farrington, 41, 376.

Meteorological Tables, Smithsonian, 49, 216.

Mexico, Liassic Flora, Wieland, 42, 370.

Michigan, Silurian rocks of northern, Crooks, 45, 59.

Microbiology, Giltner, 42, 87; Marshall, 43, 421.

Milk, Fredericksen, 49, 86; deter-

mination of added water in, Keister, **44**, 331.
Miller, D. C., Science of Musical Sounds, **41**, 561.
Miller, E., Origin of Planetary System, **46**, 542.
Miller, E. R., dustfall of March 9, 1918, **46**, 599; **47**, 133.
Miller, G. A., Mathematical Literature, **41**, 369.
Miller, W. G., euxenite in Ontario, **44**, 243; Nickel Deposits, **45**, 239.
Miller, W. J., Introduction to Historical Geology, **43**, 87.
Millikan, R. A., Electron, **44**, 333; Physics, **50**, 394.
Mills, J., Realities of Modern Science, **49**, 81.
Mine Supplies, Stronck and Billiard, **43**, 492.
Mineral Deposits, Geology of Non-Metallic, Grabau, **50**, 468.
— Industries of Vermont, **43**, 490; **50**, 238.
— Resources, Philippine Islands, 1914, **41**, 224; Texas, Phillips, **41**, 224.
— — See **GEOL. REPORTS, U. S.**
Mineralogia, d'Achiardi, **41**, 377.
Mineralogic Notes, Schaller, **42**, 85.
Mineralogist, American, **47**, 147.
Mineralogy, Descriptive, Bailey, **44**, 486; Determinative, Lewis, **41**, 149; Elements of, etc., Moses and Parsons, **43**, 420.
— Australian, Bibliography, Anderson, **43**, 339.
— of Black Lake Area, Quebec, Poitevin and Graham, **46**, 479.
— Growth, 1818-1918, Ford, **46**, 240.
Minerals, Madagascar, **43**, 174.
— Manganese, San José, Calif., Rogers, **48**, 443.
— opaque, determination, Murdoch, **42**, 85.
— radioactive, density of lead from, Richards and Wadsworth, **41**, 293.
— synantectic, Sederholm, **43**, 338.
— of the Ural Mts., **43**, 174.
— of Utah, Means, **41**, 123.
— tear-figures, Kuhara, **47**, 448.

MINERALS.

Adamite, Utah, **41**, 125. Akermanite-gehlenite system, **50**, 131. Albanite, **41**, 567. Alumogel, **41**, 567. Ambatoarinitie, **41**, 567.

MINERALS.

Amesite, **49**, 96. Anglesite, Idaho, **47**, 287. Anhydrite, **42**, 233. Apatite, Maine, **44**, 245. Apithalite, California, **49**, 367. Aragonite, and other forms of CaCO_3 , **41**, 479. Arsenic, native, Japan, **42**, 117. Arsenobismite, **41**, 127, 567. Asbestos, Quebec, **44**, 156. Augite from British Columbia, **43**, 75; Stromboli, **45**, 463. Aurobis-muthinite, **41**, 567. Bäckströmite, Sweden, **49**, 452. Barite, Calif., **48**, 443. Bassettite, **41**, 567. Belbaite, **41**, 567. Beryl, etching figures, **43**, 223. Bilinite, **41**, 568. Bismite, Utah, **41**, 126. Bismutite, Utah, **41**, 127. Bismutoplagionite, **49**, 166, 452. Bornite, composition, **41**, 409. Bütschliite, **41**, 568. Cacoclasite, Quebec, **48**, 440. Calcite, etchings, **45**, 221; Japan, **42**, 113; **48**, 124; relation to other forms of CaCO_3 , **41**, 478. Cancrinite, sulphatic, Colorado, **42**, 332, 505; optical character, **43**, 420. Carnegieite, **43**, 115. Carnotite, radium from, **41**, 214. Catoptrite, Sweden, **44**, 484. Chalcantite, Colorado, **50**, 228. Chillagite, **41**, 568. Chubutite, Argentine, **47**, 446. Cleveite, Norway, **42**, 365. Cobalt sulphates, **50**, 229. Co-cinerite, Mexico, **48**, 206; **49**, 452. Colerainite, Quebec, **45**, 478; **46**, 479. Collbranite, Korea, **45**, 477. Conchite, **41**, 490. Cordierite, Japan, **42**, 115. Covellite, **43**, 184. Crandallite, **43**, 60, 493. Creedite, Colorado, **42**, 504. Crestmorcite, **44**, 486. Cristobalite, California, **45**, 222; melting point, **46**, 417. Daubréeite, Utah, **41**, 126. Dendrites of manganese oxides, **44**, 67. Diabantite, **42**, 233. Diamond, dispersion, **47**, 441; So. Africa, **47**, 238, 448; in 1919, **50**, 472. Diasporogelite, **41**, 568. Doelterite, **41**, 568; Dufreniberaunite, **41**, 568. Dyscrasite, Australia, **49**, 278. Eakleite, California, **43**, 464. Echellite, Ontario, **49**, 452. Ectropite, Sweden, **44**, 484.

MINERALS.

Elbaite, 41, 568. Emeralds, Colombia, 42, 85. Epsomite, 46, 638. Euxenite, Ontario, 44, 243. Famatinitite, Nevada, 44, 469. Ferrazite(?), 48, 353; 49, 452. Ferri-allophane, 41, 568. Ferrierite, British Columbia, 47, 448. Ferroludwigite, 43, 494. Flokite, Iceland, 44, 485. Francolite in meteorites, 43, 322. Furnacite, 41, 568. Galena, Japan, 42, 111. Ganoophyllite, Calif., 48, 443. Garnet crystals, 44, 63. Gavite, 49, 452. Gehlenite, 43, 476; 50, 131. Geocronite, Utah, 41, 125. Geraesite, 41, 569. Gilpinite, Colorado, 45, 477. Goethite, 47, 341. Goyazite, 41, 359; 43, 163, 420. Graphite, Adirondacks, 47, 145. Griffithite, 43, 494. Grossouvreite, 41, 569. Gypsum crystals, 44, 65. Halloysites, so-called, 43, 140. Hamlinite, 41, 359; 43, 163. Hausmannite, Calif., 48, 443. Heliodor, 41, 569. Hibbenite, British Columbia, 42, 275. Hogbomite, Lapland, 47, 446. Holmquistite, 41, 569. Hydrozincite, 42, 59. Ivaite, Idaho, 45, 118. Jarosite, Utah, 41, 126. Kalbaite, 41, 569. Kaliophilite, 43, 116. Kaolinite, 48, 353. Katoptrite, 44, 485. Ktypeite, 41, 489. Kundaitte, 41, 569. Lechateliérite, 41, 569. Leifite, Greenland, 42, 504; 47, 447. Lepidocrocite, 47, 345. Leucite, 43, 117; 50, 33. Limonite, New Mexico, 47, 344; pseudomorph, 42, 233. Lorettoite, 43, 494. Lublinitite, 41, 490. Magnesioludwigite, 43, 494. Magnesite, etchings, 45, 215. Manganfayalite, Sweden, 49, 452. Margarosanite, New Jersey, 42, 159, 505; Sweden, 44, 485. Melanochalcite, 41, 211. Melanterite, Colorado, 50, 225. Melilite, 43, 476. Merrillite, 44, 486. Metatorbernite, 41, 569. Mimetite, artificial, 42, 139. Minasite, 41, 569. Mullanite, Montana, 45, 66, 478. Natrolite, British Columbia, 42,

MINERALS.

472. Natromontebrasite, 41, 569. Naumannite, Idaho, 50, 390. Nephelite, composition, etc., 43, 115, 127. Oliveiraite, Brazil, 47, 126, 447. Oruetite, Spain, 49, 452. Olivillite, Brazil, 47, 126, 447. Paredrite, 41, 356, 569. Periclaste, California, 46, 581. Phosgenite, 47, 430. Pinite, Japan, 42, 115. Platinum in 1919, 50, 471. Psilomelane, Calif., 48, 443. Pyrite, 43, 188. Pyrobelonite, Sweden, 49, 453. Pyrochroite, Calif., 48, 443. Pyrolusite, 44, 76. Pyromorphite, 43, 325. Pyrrhotite, 43, 189. Racewinite, Utah, 47, 447. Rhodochrosite, etchings, 45, 216; Calif., 48, 443. Riversideite, 44, 486. Schernikite, 41, 569. Selensulphur, Hawaii, composition, 42, 132. Serpentine, 46, 693. Siderite, etchings, 45, 216. Smithsonite, etchings, 45, 217. Sobralite, Sweden, 49, 453. Spencerite, British Columbia, 42, 275, 505; 43, 494; 44, 486. Sphalerite, Japan, 48, 124. Sphenomanganite, Sweden, 49, 453. Stibiobismuthinite, 41, 569. Stichite, 46, 479. Sulphohalite, California, 49, 76. Tephroite, Calif., 48, 443. Thaniite, 41, 569. Tin deposits, Virginia, 45, 477. Torbernite, 48, 195. Tridymite, 46, 417. Tungstenite, Utah, 45, 478. Turgite, 47, 345. Uranospathite, 41, 569. Vaterite, 41, 486. Vegasite, 41, 570. Villamaninite, Spain, 49, 453. Wavellite, 48, 353. Winchellite, 41, 570. Wollastonite and the ternary system, 48, 165. Zebedassite, Italy, 47, 447. Zincblende, Japan, 48, 124. Zinc ores, genesis of, St. Lawrence Co., N. Y., 47, 145. Zinkdibraunite, 41, 570. Mines, Canada Bureau of, publications, 41, 467, 469; 42, 84; 44, 81; 46, 477. — U. S. Bureau of, annual reports, fifth, 41, 149; sixth, 43, 86; seventh, 45, 79; eighth, 47, 143;

ninth, 49, 153; publications, 42, 83; 44, 80; 45, 80, 476; 48, 77; 49, 450; 50, 470.

Mining World Index, Vol. VIII, 42, 90.

Minnesota geol. survey, 49, 383.
— Pigeon Point geology, Daly, 43, 423.

Mirrors, Prisms, etc., Southall, 47, 228.

Mississippi embayment, erosion intervals of, Berry, 41, 222.
— geology, etc., Lowe, 41, 375.

Mississippian, correlation, Verwiebe, 43, 301.

Missouri cherts, formation, Dean, 45, 411; Devonian, Greger, 49, 265; geology, Branson, 47, 78; 49, 267; Pike Co., limestone, Rowley, 41, 317.

Mitchell, C. A., Edible Oils and Fats, 46, 615.

Mixter, W. G., thermochemistry of silicon, 42, 125; calorimetry by combustions with sodium peroxide, 43, 27.

Model Drawing, Wright and Rudd, 43, 332.

Mohave Desert, Tertiary Mammalian faunas, Merriam, 48, 399.

Mokuaweoweo, Eruption of 1914, Wood, 41, 383.

Molecular currents, Ampère, Einstein and de Haas, 41, 558.

Molecules, influence of finite volume on equation of state, Shaha and Basu, 47, 73.

Molengraaff, Coral reefs and isostasy, 44, 153.

Molinari, E., Inorganic Chemistry, 50, 73.

Montana, Devonian fauna, Haynes, 41, 375; geology and economic deposits, Rowe and Wilson, 43, 491.

Moodie, R. L., diseased vertebræ of a Sauropodous dinosaur, 41, 529; Coal Measures amphibia of North America, 42, 502.

Mook, C. C., Morrison formation, 43, 85.

Moore, C. R., Embryology, 49, 222.

Morgan, G. T., Arsenic and Antimony, 46, 615.

Morphology and Anthropology, Duckworth, 41, 564.

Morrison formation, dicotyledonous flora, Knowlton, 49, 189; Colorado type section, Lee, 49, 183.

Morro Hill, Cal., lavas, Waring, 44, 98.

Morse, E. S., living lamellibranchs of New England, 48, 477; fossil shells in Boston basin, 49, 157.

Moses, A. J., Elements of Mineralogy, etc., 43, 420.

Motion, law of dissipation, Jonson, 46, 578.

Moulton, F. R., Astronomy, 43, 17.

Mouth, Histology, Hopewell-Smith, 46, 480; 47, 148.

Mt. Desert Island, Pleistocene locality, Blaney and Loomis, 42, 399.

Mt. Rainier, Meany, 43, 417.

Mulliken, S. P., Identification of Organic Compounds, 42, 166.

Munroe, C. E., sand fusions from gun cotton, 43, 389.

Murchison Medal, London Geol. Society, 45, 478.

Murdoch, J., determination of opaque minerals, 42, 85.

Musical Sounds, Miller, 41, 561.

Muter, J., Chemistry, 44, 400.

N

Napier Tercentenary Volume, Knott, 42, 89.

Narragansett Basin, Dighton Conglomerate, Perkins, 49, 61.

National Museum, U. S., report, 41, 378; Catalogue of meteorites, 42, 283.
— Physical Laboratory, 43, 249.
— Research Council. See Research Council.

Naturalist, Diversions of a, Lankester, 41, 151.

Nature, Jubilee number, 49, 86.

Nature Study, Biological, Downing, 48, 162.

Navajo Country, geology, Gregory, 45, 145.

Navigation, Jacoby, 45, 74.

Nebraska, alkali resources, Barbour, 43, 491; new mastodon, Barbour, 41, 522; Proboscidea, Ligamentum teres in, Barbour, 41, 251.

Nebula to Nebula, Lepper, 47, 386.

Negro Education, Jones, 44, 487.

Nelson and Hayes Rivers, geology, Tyrrell, 43, 85.

Neocalamites, Berry, 45, 445.
Neon, atmospheric, constitution, 49, 445.
Nephelites, sodium-potassium, Bowen, 43, 115.
Nernst, W., Theoretical Chemistry, 43, 486.
Nevada, genesis of ores at Tonopah, Bastin and Laney, 48, 246.
Neville, H. A. D., Practical Chemistry, 49, 376.
Nervous Impulse, Conduction of, Lucas and Adrian, 45, 335.
— **System**, Involuntary, Gaskell, 42, 87; Parker, 47, 452.
Nervousness, Mastery of, Carroll, 45, 241.
Neurology, Herrick and Crosby, 45, 485.
New Jersey, palm, Berry, 41, 193.
Newman, H. H., Vertebrate Zoology, 49, 384.
Newman, L. F., Practical Chemistry, 49, 376.
New Mexico, ammonoids, Böse, 49, 26; geology, Lee and Knowlton, 47, 74, 142; Luna County, Darton, 42, 82; Manzano group, Lee, 49, 323; Pecos Valley, Tertiary intrusives, Semmes, 50, 415; stratigraphy of Eastern, Baker, 49, 99; Tertiary intrusives Semmes Co., 50, 415.
New South Wales, Burrinjuck, geophysical observations, Cotton, 43, 170; uplift on coast, Harper, 44, 48.
New York State Museum, paleontologic contributions, Ruedemann, 43, 337; reports, 12th 43, 251; 13th 46, 545; 14th 49, 151.
New Zealand, block mountains, Cotton, 44, 249; 45, 149.
— Cretaceous faunas, Woods, 45, 78.
— Cretaceous and Tertiary fish-remains, Chapman, 48, 475.
— **geol. survey**. See **GEOL. REPORTS**.
— Institute of Science, 1919, 48, 474.
— Trias, Trechman, 47, 445.
— vegetation of Lord Howe Is., Oliver, 45, 148.
Nickel Deposits, Miller and Knight, 45, 239.
Nitrates, Chili, 49, 298.
Nitrogen and oxygen, electric resolution, Yoshida, 47, 443.
Nomenclature, pre-Cambrian, Schuchert, 42, 475.
North Carolina geol. survey, 48, 78.
Northrup, E. F., Laws of Physical Science, 44, 79.
Northwest and Northeast Passages, 1576-1611, Alexander, 41, 471.
Norway, geology of Finmarken, Holtedahl, 47, 79, 85.
Norwegian Arctic Expedition, geol. report, Holtedahl, 45, 333; 50, 169.
Nova Scotia, Arisaig Silurian, McLearn, 45, 126.
Noyes, W. A., Organic Chemistry, 43, 81; 49, 444.

O**OBITUARY.**

Abbe, Cleveland, 42, 509. Aitken, J., 49, 86. Assheton, R., 41, 152. Atkinson, G. F., 47, 84.
Backhouse, T. W., 50, 82.
Baeyer, A. von, 44, 338. Baird, J. B., 47, 454. Barrell, F. R., 41, 226. Barrell, J., 47, 454; 48, 251. Bastian, H. C., 41, 152. Becker, G. F., 47, 390; 48, 242. Beebe, W., 43, 342. Bell, R., 44, 338. Blake, J. M., 50, 316. Blanchard, R., 47, 454. Bouchard, C. J., 41, 152. Brashear, J. A., 49, 390. Braun, F., 48, 402. Buchner, E., 44, 338.
Cairnes, DeL. D., 44, 338. Chappuis, P., 41, 382. Choffat, M. P., 48, 250. Clark, W. B., 44, 247. Crookes, Sir W., 47, 454.
Danne, J., 47, 454. Darboux, J. G., 43, 497. Debus, H., 41, 306. DeCandolle, A. P., 50, 82. Deprez, M., 47, 240. Derby, O. A., 41, 152. Dresser, H. E., 41, 226. Drysdale, C. W., 44, 338. DuBois, H. E. J. G., 47, 240. Duhem, P., 42, 509.
Eastman, C. R., 46, 602. Elliot, D. G., 41, 306. Ellis, W., 43, 174.
Farlow, W. G., 48, 80; 49, 87.
Galitzin, Prince B., 42, 372.
Gautier, Armand, 50, 398.
Gerard, E., 41, 472. Gilbert,

OBITUARY.

G. K., **45**, 485; **46**, 669. Gregory, R. P., **47**, 148.
 Haeckel, E. H., **48**, 250. Hague, Arnold, **43**, 497; **44**, 73. Hau-
 ron, L. D. du, **50**, 474. Hayes, C. W., **41**, 382. Heckel, E., **41**, 472. Hidden, W. E., **46**, 480. Hilgard, E. W., **41**, 226. Hinde, G. J., **45**, 485. Hitchcock, C. H., **48**, 478. Holden, C. F., **41**, 152. Hopkins, C. G., **48**, 478. Hughes, T. McK., **44**, 160. Hull, Edward, **45**, 80.
 Iddings, J. P., **50**, 316. Irving, J. D., **46**, 550.
 Jones, H. C., **41**, 472. Judd, J. W., **41**, 472. Julien, A. A., **47**, 454. Jungfleisch, E., **42**, 90. Jungersen, H. F. E., **44**, 86. Kennedy, H. T., **44**, 160. Lambe, L. M., **47**, 454. Lap-
 worth, C., **49**, 389. Lebour, G. A., **45**, 424. Letts, E. A., **45**, 424. Lignier, O., **42**, 90. Lowell, P., **42**, 509.
 MacLaurin, R. C., **49**, 156. Mac-
 coun, J. M., **49**, 455. Mark-
 ham, Sir C. R., **41**, 382. Mass-
 see, G., **43**, 497. Messel, R., **49**, 455. Metchnikoff, E., **42**, 170. Miller, N. H. J., **43**, 342. Mo-
 berg, J. C., **41**, 306. Mohn, H., **43**, 88. Moses, A. J., **49**, 389. Oliver, D., **43**, 174. Osler, Sir Wm., **49**, 156.
 Pavlov, I. P., **41**, 382. Pearson, H. H. W., **43**, 88. Peary, R. E., **49**, 226. Peckham, S. F., **46**, 620. Pedler, A., **46**, 480. Pfeffer, W., **49**, 455. Phillips, W. B., **46**, 602. Pickering, E. C., **47**, 240. Pirsson, L. V., **49**, 86; **50**, 173. Prosser, C. S., **42**, 372. Purdie, T., **43**, 342.
 Ramsay, Sir W., **42**, 170. Rath-
 bun, R., **46**, 620. Rayleigh, Lord, **48**, 249. Raymond, R. W., **47**, 148. Reid, C., **43**, 174. Rhys, Sir J., **41**, 306. Richards, C. B., **47**, 454. Richard, J. W., **41**, 472. Ricketts, P. deP., **47**, 84. Roscoe, Sir H. E., **41**, 152. Royce, J., **42**, 372. Rücker, Sir A., **41**, 152.
 Sabine, W. C. W., **47**, 390. Sarasin, E., **44**, 338. Schwalbe, G., **42**, 372. Schwartzschild, K., **42**, 372. Seligmann, G., **50**, 172.

OBITUARY.

Smith, H. H., **47**, 390. Stock-
 well, J. N., **50**, 398. Stone, G. H., **44**, 86. Strutt, J. W., **48**, 249. Stuart, T. P. A., **49**, 390. Sylow, L., **47**, 390.
 Thompson, S. P., **42**, 90. Tid-
 deman, R. H., **43**, 497. Torn-
 quist, S. L., **50**, 474. Trail, J. W. H., **48**, 478. Trowbridge, C. C., **46**, 550. Turner, Sir W., **41**, 382.
 Van Hise, C. R., **47**, 84. Vasseur, G., **41**, 152. Vaughan, A., **41**, 226. Von Bardeleben, K. H., **47**, 454.
 Watson, W., **47**, 390. Watts, W. M., **47**, 240. Whitman, F. P., **49**, 226. Williams, H. S., **46**, 550. Williston, S. W., **46**, 620; **47**, 220. Worthen, G. C., **47**, 454. Worthington, A. M., **43**, 174. Wright, A. W., **41**, 152, 361. Wrightson, J., **43**, 174.
 Zeiller, C. R., **41**, 226.
Observatory, Allegheny, publica-
 tions, **41**, 306; **45**, 336:
 — Cincinnati, **45**, 336.
 — Melbourne, **45**, 336.
 — U. S. Naval, publications, **41**, 306.
 — Yerkes, publications, **45**, 472; **49**, 225.
Oceanica, continental fracturing
 and diastrophism, Schuchert, **42**, 91.
Oceanography, Buchanan, **49**, 217;
 Italian investigations, **45**, 335.
O'Connell, M., costæ in the peri-
 sphinctinæ, **48**, 450.
Ohio, Berea formation, Verwiebe,
42, 43; Building Stones, Bow-
 nocker, **41**, 224; geologic map,
 Bownocker, **50**, 239.
Oil Fields, Mid-Continent, Bos-
 worth, **49**, 450.
Oil Geology, Ziegler, **45**, 423.
Oil and gas resources of Kentucky,
 Jillson, **49**, 152.
Oils and Fats, Mitchell, **46**, 615.
Oklahoma, Hogshooter gas sand,
 Berger, **48**, 189.
Oldham, R. C., Structure of the
 Himalayas, **45**, 76.
Ontario Basin, Study of, Coleman,
44, 351, 487; Peninsula, geology,
 Williams, **49**, 83; shore-line,
 origin and age, Spencer, **43**, 351.

Ophiuroidea, Japanese, Matsumoto, 44, 404.
Optical contact of glass by heat, Parker and Dalladay, 43, 411.
Ordovician, Madison, Indiana, McEwan, 50, 154.
Oregon Cascades, geology, Smith, 46, 546.
— radiolarian cherts, Smith, 42, 299, 504.
Oreodonts, Loomis, 50, 281.
Organic Compounds, Identification, Mulliken, 42, 166.
Organism, Unity of, Ritter, 49, 220.
Osborn, H. F., Men of the Old Stone Age, 41, 217; Origin and Evolution of Life, 45, 77; Equidae, 46, 770.
Osteological Material from Machu Picchu, Eaton, 42, 86, 281.
Ostwald, W., Colloidal Chemistry, 41, 295; 47, 226.
Ozark Highland, Missouri, geography, 49, 219.
Ozone, Vosmaer, 42, 432; absorption bands, Fowler and Strutt, 45, 143.
— and ultra-violet transparency of the atmosphere, Strutt, 46, 543.

P

Pacific Islands, problems, Daly, 41, 153.
— volcanic domes in, Powers, 42, 261.
Page, L., a century's progress in physics, 46, 303.
Paleobotany, Seward, 49, 223; Guppy, 49, 372; Wieland, 49, 382.
Paleogeography, Arldt, 50, 238; in the Arctic, Holtedahl, 49, 1, 308.
— See **GEOLOGY**, Cycads, etc.; also **Plants**.
Paleontology, Davies, 50, 467; von Zittel and Broili, 44, 336.
— Invertebrate, Woods, 50, 170.
— present tendencies, Berry, 48, 1.
— vertebrate, development, Lull, 46, 193.
Paleozoic diastrophism, Schuchert, 50, 339.
— of Lake Timiskaming, Hume, 50, 293.
— See **GEOLOGY**.
Palmer, H. S., determination of depth of strata; and projection of dip, 47, 236.
Parker, G. H., Nervous System, 47, 452.
Parsons, C. L., Elements of Mineralogy, etc., 43, 420.
Passivity, electron theory of, Dean, 47, 123.
Pasteur, History of a Mind, Duclaux, Smith and Hedges, 50, 80.
Patagonia, San-Jorge formation, Windhausen, 45, 1.
Pearl, R., Genetics, 41, 379.
Pearson's method for arsenic determination, 48, 391.
Peat in Wisconsin, Huels, 41, 225.
Pebbles, rounded, Australia, Jutson, 48, 429.
Pennsylvania, geologic section, Butts, 45, 523; Middle Ordovician, Field, 48, 403; oil and gas map, 1915, 42, 84.
Periodic table, modification, Hackh, 46, 481.
Perkins, E. H., Dighton conglomerate of Mass. and Rhode Island, 49, 61.
Perret, F. A., lava eruption of Stromboli, 1915, 42, 443.
Perry, H., Theories of Energy, 45, 419.
Peru, Andes of, Bowman, 43, 416; Cuzco, geology, Gregory, 41, 1; Indians of, Ferris, 43, 339; osteological material from Machu Picchu, Eaton, 42, 86, 281.
Peters, C. A., succinic acid as a standard, 41, 244.
Peterson, O. A., American Diceratheres, 50, 396.
Petrography, Hommel, 50, 75.
Petroleum Handbook, Andros, 49, 214.
Petrology, Weinschenk and Johannsen, 43, 173; Hawaiian, Powers, 50, 256; rise of, Pirsson, 46, 222.
Petrunkewitch, A., Morphology of Invertebrate Types, 43, 421.
Pharmacognosy, Kraemer, 41, 380.
Philippine Islands, mineral resources, 1914, 41, 224; Journal of Science Index, 45, 424.
Phillips, A. H., new zinc phosphates from British Columbia, 42, 275; new forms of natrolite, 42, 472; vanadium in sedimentary rocks, 46, 473.
Phosphate deposits of Florida, Selards, 41, 299; Matson, 41, 300.

Phosphates of the Western United States, Mansfield, 46, 591.
Phosphorus, geologic rôle, Black-welder, 42, 285.
Photographic phenomenon, 49, 146.
Physical Science, Laws of, Northrup, 44, 79.
 — Tables, Smithsonian, Fowle, 50, 466.
Physics, a century's progress, Page, 46, 303.
 — Experiments in, Franklin and MacNutt, 46, 618.
 — General, Crew, 42, 501; Franklin and MacNutt, 43, 168.
 — Measurements, Ferry, 47, 138.
 — Molecular, Crowther, 48, 473.
 — Practical, Millikan and Gale, 50, 394.
 — Problems in, Henderson, 42, 500; Masius, 44, 404.
 — Technical, Anderson, 47, 229; Arnold, 42, 437.
 — Textbook, Duff, 42, 436.
Physiology, Chemical, Cramer, 46, 549; Elementary, Huxley, 41, 151.
Phytopathology, Whetzel, 46, 549.
Pidduck, F. B., Electricity, 42, 79.
Piedmont terraces of Appalachians, Barrell, 49, 227, 327, 407.
Pierce, G. W., Electric Oscillations and Electric Waves, 49, 303.
Pigeon Point, Minnesota, Geology, Daly, 43, 422.
Pillsbury, W. B., Psychology, 43, 254.
Pirsson, L. V., rise of Petrology as a science, 46, 222.
 — Physical Geology, 50, 469.
 — obituary notice, W. Cross, 50, 173.
Planetary System, Origin, Miller, 46, 542.
Plants, see **BOTANY**.
 — Australian flowering, geological history, Andrews, 42, 171; 43, 174, 339.
 — fossil, Berry, 45, 78; Knowlton, 49, 189; Seward, 46, 475; 49, 223.
 — Mesozoic and Cenozoic of N. America, Knowlton, 49, 307.
 — and animals, evolution, Berry, 49, 207.
Plaster of Paris, Troxell, 41, 199.
Platinum, in 1919, 50, 471; in peridotite, Urals and Spain, Duparc, 43, 173; Russian, 49, 451.
Pleistocene deposits, relative ages, Hay, 47, 361; Mt. Desert Is., 42, 399; see **GEOLGY**.
Pogue, J. E., emerald deposits of Muzo, Colombia, 42, 85.
Poiseuille's law for compound tubes, Schleier, 49, 447.
Poisson's Equation, failure of, Prasad, 44, 333.
Polarimetry, 45, 418.
Polarization surface, Jentzsch-Gräfe, 48, 472.
Porter, J. G., All-American Time, 47, 310.
Porter, L. E., detection and separation of tellurium, arsenic, etc., 42, 106; separation of gallium, 44, 221.
Porto Rico, 1918 Earthquake, 50, 236; Scientific Survey, 50, 237.
 — Tertiary formations of, Maury, 48, 209.
Posnjak, E., hydrated ferric oxides, 47, 311.
Potash, extraction from silicate rocks, Ross, 43, 485.
 — See **CHEMISTRY**.
Potential measurements, switch for, White, 46, 610.
Pottsville formations and faunas, Mather, 43, 133.
Powers, S., explosive ejectamenta of Kilauea, 41, 227; volcanic domes in the Pacific, 42, 261; granite in Kansas, 44, 146; Butler salt dome, Texas, 40, 127; Hawaiian petrology, 50, 256.
Pratt, H. S., Zoology, 41, 150.
Pre-Cambrian era, Lawton's correlation, Lane, 43, 42; see **GEOLGY**.
Precious Stones in 1917, Kunz, 47, 238; in 1919, 50, 471.
 — in 1914, Sterrett, 41, 223.
Precipitation, rhythmic, and diffusion, Stansfeld, 43, 1.
Pressure, effect on crystals and rocks, Bridgman, 45, 243.
 — external, growth of crystals under, Taber, 41, 532.
Pribilof Islands, geological notes on, Hanna, 48, 216.
Prickly Pear, Australia, Alexander, 48, 475.
Priestley memorial, 44, 332.
Prime numbers, Thompson, 45, 418.
Projectile, motion of a spinning, Prescott, 45, 329.
Prosser, C. S., stratigraphic posi-

tion of Hillsboro sandstone, 41, 435.
Psychology, Pillsbury, 43, 254; Watson, 49, 221.
Pumpelly, R., My Reminiscences, 47, 82.
Punnett, R. C., Mendelism, 49, 384.
Pyromorphite crystals, Shannon, 43, 325.
Pyrometry, Practical, 45, 75.

Q

Qualitative, Quantitative Analysis, See **CHEMICAL WORKS**.
Queensland Museum memoirs, 41, 225; 43, 422; 47, 452.
Quirke, T. T., radioactivity of meteorites, 44, 237.

R

Radiation constants, Henning, 48, 470.
— new secondary, of positive rays, Wolfke, 45, 331.
— terrestrial, transmission of, Very, 41, 513.
Radio communication, 47, 444.
Radioactive lead, atomic weight, Richards and Wadsworth, 43, 166; density, 41, 293; 42, 365.
— mineral springs of Colorado, 46, 621.
Radioactivity, Makower and Geiger, 49, 304.
Radioscopic fluorescent screens, Roubertie and Nemirovsky, 48, 392.
Radium, absorption spectrum, de Broglie, 49, 79.
— from carnotite, Parsons, et al., 41, 214.
— life of, Gleditsch, 41, 112.
Radium and uranium ratio, Lind and Roberts, 50, 72; relative activity, Boltwood and Johnstone, 50, 1, 72.
Radium-D, beta-rays, Meitner, 41, 145.
Raman, C. V., mechanical theory of bowed strings, 48, 74.
Ramsay, W., Gases of the Atmosphere, 41, 557.
Rainier, Mt., Meany, 43, 417.
Rankin, G. A., the ternary system, $MgO-Al_2O_3-SiO_2$, 45, 301.

Rathbun, Mary J., fossil crab, 41, 344; decapod Crustaceans, 47, 234.
Rathbun, R., obituary, 46, 757.
Raymond, P. E., Beecher's classification of trilobites, 43, 106.
Reagents and Reactions, Tognoli, 45, 328.
Reese, A. M., Zoology, 47, 452.
Reeves, J. R., Anderson esker, 50, 65.
Refraction, determination of indices of, Fabry, 49, 143, 148.
Refractive indices, determination, Fabry's, Uhler, 49, 143, 148.
Relativity, Cunningham, 41, 297.
— Einstein-Lawson, 50, 405.
— generalized, and gravitation theory, 43, 247.
— and gravitation, Woolard, 45, 425.
Religion and Science, Woodburne, 50, 80.
Research Council, National, organization, 48, 163; 49, 156; 50, 79; building, 50, 473.
Resistance-box plugs, lubrication, Manley, 43, 331.
Respiratory Exchange of Animals, and Man, Krogh, 43, 422.
Rhode Island, geology, Hawkins, 46, 437; Perkins, 49, 61.
Richardson, G. B., age of Scranton coal, Colorado, 43, 243.
Richardson, O. W., Emission of Electricity from Hot Bodies, 42, 369.
Richter's Organic Chemistry, Spielmann, 48, 469.
Richthofenia in Texan Permian, Böse, 44, 157.
Ridgway, R., Birds of No. America, 42, 86; 48, 402.
Ries, H., Economic Geology, 43, 252, 339; dolomitic clay, 44, 316.
Righi, Augusto, 50, 466.
Rings, Kunz, 43, 339.
Ripple marks, recent and fossil, Kindle, 43, 491.
Ripples, origin of fossil, etc., Bucher, 47, 149, 241.
Ritter, W. E., Unity of Organism, 49, 220.
Robbins, H. E., conductivity cell for electro-titration, 41, 246.
Robbins, W. W., Botany of Crop Plants, 45, 242.
Robertson, T. B., Physical Chemistry of Proteins, 46, 548.

Robinson, H. H., summation of analyses of igneous rocks, 41, 257; Barrell's Piedmont terraces edited, 49, 227, 327, 407.

Robinson, W. I., Paleozoic Alcyonarian Tumularia, 42, 162; Tetra-coralla, etc., 43, 337.

ROCKS.

- Bahiaite, 41, 330.
- Calcite-brucite rocks, Rogers, 46, 582.
- Charnockite series, Washington, 41, 323.
- Chemical Analyses, Washington, 45, 238; 48, 161.
- Diabase, Rhode Island, 46, 452; cylinders, Emerson, 41, 321.
- Gabbro, lopolith, Grout, 46, 516; Rhode Island, Hawkins, 46, 455.
- Granite, Kansas, Powers, 44, 146; Twenhofel, 43, 363; 48, 132.
- hypersthene, 41, 324.
- Killarney, Collins, 41, 564.
- Green schist, Rhode Island, 46, 449.
- Hommel's Petrography, 50, 75.
- Hyalo-dacite, 50, 453.
- Italite, new, 50, 33.
- Lavas of Morro Hill, Cal., Waring, 44, 98.
- Leucite rock, 50, 33.
- Magmatic sulphide ores, Tolman and Rogers, 44, 156.
- Metagabbro, etc., Adirondacks, 48, 147.
- Myrmekite, 43, 338.
- Nephelite rocks, Hawaiian, 50, 274.
- Norite, 41, 328.
- Obsidian, Lipari, 50, 446.
- Peridotite, Spain, Urals, 43, 173.
- Pumicite, Nebraska, Barbour, 44, 83.
- Quartz diorite, hypersthene, 41, 326.
- Rocks, Analysis, Hillebrand, 49, 78.
- of Cuzco, Peru, Gregory, 41, 1.
- eruptive, at Cuttingsville, Vermont, Eggleston, 45, 377.
- foliation and metamorphism, Bonney, 48, 477.
- Igneous, of Carrizo Mountain, Arizona, Emery, 42, 349; densities of, Iddings, 49, 363; summation of analyses, Robinson, 41, 257.

ROCKS.

- Rocks, Silicate, extraction of potash, Ross, 43, 485.
- Rhyolites, Lipari, 50, 446.
- Tertiary intrusives in New Mexico, Semmes, 50, 415.
- Trachyte, Hawaiian, 50, 268.
- Rockwood, E. W.**, Chemical Analysis, 41, 144.
- Rocky Mts.**, Mesozoic physiography, Lee, 47, 78.
- Rodents of Iowa**, Stoner, 47, 239.
- Rogers, A. F.**, cristobalite in California, 45, 222; American occurrence of periclase, 46, 581; manganese minerals, San Jose, Calif., 48, 443.
- Roscoe, H. E.**, Biographical Sketch, Thorpe, 43, 80.
- Rose, J. N.**, Cactaceæ, 49, 222.
- Ross, C. S.**, age of iron ore in Eastern Wisconsin, 41, 187.
- Rowley, R. R.**, Edgewood limestone of Pike Co., Missouri, 41, 317.
- Russell, E. J.**, Soils and Manures, 42, 283; Soil Conditions and Plant Growth, 45, 423.
- Rutherford, E.**, penetrating power of X-rays, 44, 401.
- Ruthven, A. G.**, Animal Biology, 50, 76.
- Rydberg Series Constant**, Curtis, 49, 300.

S

- St. Lawrence river**, birth of, Spencer, 43, 351.
- Sakhalin**, "Miocene flora" of, Kryshtofovich, 46, 502.
- Sakura-jima**, Eruption in 1914, Koto, 43, 338.
- Salt crystals**, formation, Long, 43, 289.
- deposition, Grabau, 50, 468.
- dome, Texas, Powers, 49, 127.
- Sand fusions** from gun cotton, Munroe, 43, 389.
- rounding of, Galloway, 47, 270; Kindle, 47, 431.
- Sangamon**, Ill., fossil beetles from, Wickham, 44, 137.
- Sanitation**, State, Massachusetts. Whipple, 43, 496.
- Sarawak Museum Journal**, 46, 479.
- Sarker, B. K.**, Hindu Achievements in Science, 47, 230.
- Sauchelli, U.**, succinic acid as a standard, 41, 244.

Savage, T. E., age of iron ore in Eastern Wisconsin, 41, 187; Early Silurian rocks of No. Michigan, 45, 59; Devonian of Illinois, 49, 169.

Sayles, aqueo-glacial sediments, 50, 239.

Sayre, *Materia Medica*, 44, 86.

Schaller, W. T., mineralogic notes, 42, 85; crandallite, 43, 69; identity of hamlinite with goyazite, 43, 163; Gems, 47, 145.

Schenck, R., Physical Chemistry of Metals, 49, 147.

Schmucker, S. C., Evolution, 41, 151.

Schneider, A., Food and Drug Laboratories, 41, 381; Microbiology of Foods, 50, 172.

Schrammen, Collection of Cretaceous Silicispongiae, 49, 152.

Schuchert, C., continental fracturing and diastrophism in Oceanica, 42, 91; pre-Cambrian nomenclature, 42, 475; Hébert (1857) on periodic submergence of Europe, 43, 35; Carboniferous of the Grand Canyon of Arizona, 45, 347; Cambrian of the Grand Canyon of Arizona, 45, 362; historical geology, 1818-1918, 46, 45; notice of H. S. Williams, 46, 682; Earth's Changing Surface, 46, 770; Taconic system resurrected, 47, 113; fossil hydroid Beatricea, 47, 293; obituary notice of J. Barrell, 48, 251; Paleozoic crustal instability in No. America, 50, 399.

Science, *Century of, 1818-1918*, 46, 1; 47, 310.
 — Elements of General, Caldwell and Eikenberry, 46, 600.
 — Introduction, Clark, 45, 420.
 — Realities of Modern, Mills, 49, 81.
 — Short History of, Sedgwick and Tyler, 45, 240.
 — Teaching, Twiss, 45, 332.

Scott, S. E., detection and separation of germanium, 44, 313; 46, 663.

Scott, W. B., Evolution, 44, 84.

Scott, W., determination of vanadic acid, 46, 427.

Scott, W. W., Chemical Analysis, 48, 70.

Scranton Coal, Colorado, age, Richardson, 43, 243.

Sedgwick, W. T., History of Science, 45, 240.

Sedimentation, Shaw, 49, 84.

Sediments, aqueo-glacial, Sayles, 47, 446.

Seidell, A., Solubilities of Inorganic and Organic Compounds, 49, 78.

Sellards, E. H., Florida phosphates, 41, 299; fossil human remains, discovery in Florida, 42, 1; new tortoise from Florida, 42, 235; human remains at Vero, Florida, 47, 358; Comanchean formation under Florida, 48, 13.

Sammes, D. R., Tertiary intrusives of the Pecos Valley, New Mexico, 50, 415.

Serpentine, origin, Benson, 46, 693.

Seward, A. C., Fossil Plants, 46, 475; 49, 223.

Shannon, E. V., crystals of pyromorphite, 43, 325; famatinite from Goldfield, Nevada, 44, 469; mullanite, 45, 64; ilvaite, Idaho, 45, 118; anglesite, Idaho, 47, 287; amesite, 49, 96; bismutoplagonite, 49, 166; naumannite in Idaho, 50, 390.

Sheet flows, etc., Australia, Jutson, 48, 435.

Sherman, H. C., Chemistry of food, 46, 548.

Shimer, H. W., fossiliferous Miocene bowlders, Block Island, 41, 255.

Shipley, J. W., volcanic emanations Katmai, Alaska, 50, 141.

Shore Processes, etc., Johnson, 48, 395.

Shuler, E. W., Dinosaur tracks in Glen Rose limestone, Texas, 44, 294.

Shull, A. F., Animal Biology, 50, 76.

Siebenthal, C. E., zinc and lead deposits of Joplin, 41, 375.

Signalling by light rays, Wood, 49, 214.

Silberstein, L., Electromagnetic Theory of Light, 47, 140.

Silicate specific heats, White, 47, 1.

Silliman, Benjamin, founder of the Amer. Journal of Science, 46, 11.

Simotomai, H., Tarumai dome in Japan, 44, 87.

Simpson, G. S., detection and separation of tellurium, arsenic, etc., 42, 106.

Sinclair, W. J., new labyrinthodont

from Pennsylvania, 43, 319; Parasuchian from the Triassic of Penn., 45, 457.

Sinnott, E. W., coniferous woods of the Potomac formation, 41, 276.

Skeats, E. W., coral-reef problem and Funafuti borings, 45, 81; and dolomite formation, 45, 185.

Smith, A. J., Chemistry of Metabolism, translation, 42, 442.

Smith, C. M., lead-chlor arsenate, 42, 139; Electric and Magnetic Measurements, 43, 415.

Smith, E. A., Zinc Industry, 46, 689.

Smith, E. F., Life of Robert Hare, 44, 76; Life of James Woodhouse, 46, 541; Electro-Analysis, 46, 766; Chemistry in Old Philadelphia, 47, 383; James Cutbush, Amer. Chemist, 1788-1823, 49, 79.

Smith, G., dyscrasite, Australia, 49, 278.

Smith, G. McP., Quantitative Chemical Analysis, 48, 468.

Smith, G. O., century of government geological surveys, 46, 171.

Smith, W. D., radiolarian cherts in Oregon, 42, 299, 504.

Smithsonian Institution, annual report, 1915, 41, 303; 1916, 43, 87; 1917, 45, 149; 1918, 47, 146; 1919, 49, 154.

— Explorations and Field Work in 1916, 43, 497; 1919, 50, 80.

— Meteorological Tables, 49, 216.

— Physical Tables, Fowle, 50, 466.

Smyth, C. P., moisture content of typical coals, 45, 174.

Soderman, M. A., barium and strontium, separation, 46, 538.

Sodium, line spectrum, Strutt, 49, 302.

— vapor, fluorescence, Strutt, 41, 144; ionizing potential, Wood and Okano, 44, 401; resonance, radiation, Mohler and Wood, 47, 442.

— See **CHEMISTRY**.

Soil Conditions and Plant Growth, Russell, 45, 423.

— Physics and Management, Mosier and Gustafson, 45, 484.

Soils, manganese in, Johnson, 43, 410.

— and Manures, Russell, 42, 283.

Solar radiation, 44, 482.

Solubilities of Inorganic and Organic Compounds, Seidell, 49, 78.

Solution, Nature of, Jones, 44, 78.

Sosman, R. B., work of the Geophysical Laboratory, Washington, 46, 255.

Sounds of drops falling on water, Mallock, 47, 136.

South Africa geol. survey, 41, 564.

South America, Cretaceous-Tertiary boundary, Windhausen, 45, 1.

— — See **Peru**.

South Australia, Geology, Howchin, 47, 389; Jack, 45, 147; Talbot and Clarke, 47, 389.

— geol. survey. See **GEOLOGICAL REPORTS**.

Southall, J. P. C., Mirrors, Prisms, and Lenses, 47, 228.

Specific heats, silicate determination, White, 47, 1.

Spectograph, positive ray, Aston, 49, 444.

Spectra, hydrogen, Stark, 41, 465.

— interference of reversed, Barus, 41, 414.

— iron, King, 46, 767.

— of isotopes, Merton, 49, 213.

— of lead and thallium, Merton, 49, 213.

— Origin, Thompson, 48, 70.

— rotation of interference fringes, Barus, 42, 63.

— ultra-violet of helium, hydrogen, etc., Richardson and Bazzoni, 45, 73.

— X-ray, iodine and tellurium, Siegbahn, 41, 465.

Spectral series and atomic number, Bell, 47, 227.

Spectograms, interpolations on, Merwin, 43, 49.

Spectroheliograph, Rumford, of Yerkes Observatory, Hale and Ellerman, 45, 472.

Spectrum of helium, 49, 81.

— interferometry, Barus, 41, 414; 42, 63, 402; 43, 145.

— of iron, Hemisalech, 43, 413.

— lines, distribution of intensity, Nicholson and Merton, 14, 466; structure of broadened, Merton, 42, 77.

— of radium, 49, 79.

— solar, Einstein-displacement, 50, 394; occurrence of ultra-violet bands in, Fowler and Gregory, 46, 617.

— See **Spectra**.

Spencer, J. F., Metals of Rare Earths, **49**, 78.
Spencer, J. W., origin and age of the Ontario Shore-line, **43**, 351.
Spencer, S. R., separation of caesium, etc., **42**, 279.
Sphere moving in a liquid, inertia, Cook, **49**, 379.
— plotting crystal zones on, Blake, **43**, 237.
Spheroid, rotating, straticulate, Keyes, **47**, 108.
Spiritualism, report of Seybert Commission, **50**, 81; Truth of, Mrs. D. Humphreys, **50**, 81.
Springer, F., *Mysticocrinus*, **46**, 666.
Standards, Bureau of, report, **49**, 155.
Stansfield, J., retarded diffusion and rhythmic precipitation, **43**, 1.
Starling, E. H., Lecture on the Heart, **45**, 424.
Stars of the Southern Heavens, Catalogue, Delavan, **49**, 225.
Steels, Graphite, etc., Analysis, Johnson, **47**, 297.
Stefanini, G., geological history of Venetia, **44**, 299.
Steiger, G., sulphatic cancrinite from Colorado, **42**, 332.
Sterrett, D. B., Gems and Precious Stones in 1914, **41**, 223.
Stevens, W. C., Plant Anatomy, **42**, 284.
Stevenson, J. J., origin of form-kohle, **43**, 211.
Stillman, T. B., Engineering Chemistry, **43**, 166.
Stoddard, J. T., Organic Chemistry, **47**, 135.
Stoichiometry, Young, **46**, 689.
Stone Age, Men of, Osborn, **41**, 217.
Stratigraphy of Eastern New Mexico, Baker, **49**, 99; Lee, **49**, 323.
Stromboli, augite, Kozu and Washington, **45**, 463; lava eruption, 1915, Perret, **42**, 443.
Strutt, R. J., electric discharges in gases and vapors, **45**, 234.
Succinic Acid. See **CHEMISTRY**.
Suess, E., Face de la Terre, **47**, 235.
Sulphides, dissociation pressures of, Allen and Lombard, **43**, 175.
Sulphite, liquor, utilization, Tartar, **41**, 367.
Sulphur, recovery, Wells, **44**, 330.
Sun-spots, nature, Hale, **47**, 302.
Surface Tension and Energy, Wil-lows and Hatschek, **47**, 302.
Switch, electric, White, **46**, 610.
Switch for Thermoelement work, and other measurements, White, **41**, 307.

T

Taber, S., growth of crystals under external pressure, **41**, 532.
Tables for Engineers, etc., Ferris, **47**, 309.
Taconic system, Schuchert, **47**, 113.
Tactite, Hess, **48**, 377.
Tampico, geology, Dumble, **47**, 79.
Tarr, W. A., origin of chert in the Burlington limestone, **44**, 409; **45**, 149.
Tashiro, S., Chemical Sign of Life, **44**, 84.
Tear-figures of minerals, Kuhara, **47**, 448.
Technical Review, **50**, 81.
Teeth, Filling, etc., Johnson, **46**, 772.
Telegraphy, Lee, **45**, 237.
Telephone, Kingsbury, **41**, 297.
Temperature coefficient of a heterogeneous reaction, Van Name, **43**, 449.
— equilibrium of a body exposed to radiation, Fabry, **44**, 480.
— variation, mean annual, Arctowski, **43**, 402.
Tennessee, Devonian of, Dunbar, **49**, 307; geology of Rutherford Co., Galloway, **50**, 239.
Ternary system, $\text{CaO}-\text{MgO}-\text{SiO}_2$, Ferguson and Merwin, **48**, 81, 165; $\text{MgO}-\text{Al}_2\text{O}_3-\text{SiO}_2$, Rankin and Merwin, **45**, 301.
Test, L. A., Qualitative Analysis, **48**, 469.
Texas, Butler salt dome, Powers, **49**, 127; Dinosaur tracks, Shuler, **44**, 294.
— geology of, Udden, Baker and Böse, **43**, 252; Dumble, **50**, 238; of Glass Mts., Udden, Baker and Bowman, **47**, 79, 387; Böse, **47**, 305.
— Mineral Resources, Phillips, **41**, 224.
— Pectinidæ, Kniker, **47**, 234.
— Permo-Carboniferous, ammonoids of, Böse, **47**, 305.
— University bulletin, **44**, 158.
Thaxter, R., obituary notice of W. G. Farlow, **49**, 87.
Thermochemistry of silicon, Mixer, **42**, 125.
Thermoelement work, switch for, White, **41**, 307.

Thomson, J. A., Brachiopoda of the Australasian Antarctic Expedition, 48, 397; Secrets of Animal Life, 49, 220.

Thomson, J. J., Origin of Spectra, 48, 70.

Thorium, alpha-particles from, Rutherford, 41, 561.

Thornton, W. M., Jr., separation of thorium from iron, 42, 151.

— See CHEMISTRY.

Thorp, F. H., Industrial Chemistry, 42, 165; 46, 615, 689; 47, 135, 382.

Thorpe, E., Biographical Sketch of H. E. Roscoe, 43, 80.

Thorpe, M. R., Abajo Mts., Utah, 48, 379; Oligocene (White River) Felidae, 50, 207.

Thum, E. E., metallurgy, 47, 298.

Time, All-American, Porter, 47, 310.

— wave work as a measure of, Coleman, 44, 351, 487.

Tin, oxychloride of, new, Keller, 44, 480.

— See CHEMISTRY.

Tintic Mining District, Utah, Geology, Lindgren and Loughlin, 48, 246.

Tizard, H. T., Theoretical Chemistry, 43, 486.

Tognoli, E., Reagents and Reactions, 45, 328.

Tothill, J. D., ancestry of insects, 42, 373.

Transkei Country, So. Africa, geology, Rogers, 45, 146.

Treadwell, F. P., Analytical Chemistry, 42, 74.

Triassic and Jurassic in Idaho, Mansfield, 50, 53.

Tridymite, melting point, Ferguson and Merwin, 46, 424.

Trigonometry, Barker, 45, 237.

Trilobites, ancestry, Tothill, 42, 373.

— appendages, Walcott, 47, 231.

— Beecher's classification, Raymond, 43, 196.

— Bohemian, Novak, 49, 306.

— Cambrian, Walcott, 41, 301; 42, 432.

— (Lichadidae) Foerste, 49, 26.

Troxell, E. L., plaster of Paris, 41, 199; early Pliocene one-toed horse, 42, 335; Oligocene camel, 43, 381; Oligocene Artiodactyl, 49, 391; Entelodonts in the Marsh Collection, 50, 243, 361, 431.

Turnbull, A., Life of Matter, 49, 221.

Turner, W. A., vanadium determined by cupferron, 41, 339; separation of vanadium, 42, 109.

Tuttle, L., Theory of Measurements, 44, 79.

Twenhofel, W. H., granite boulders of Kansas, 43, 363; chert of the Wreford and Foraker limestone of Kansas, etc., 47, 407; granite boulders of Kansas, 48, 132; Pre-Cambrian and Carboniferous algal deposits, 48, 339; Comanchean and Dakota strata, Kansas, 49, 281.

Twins, Biology, Newman, 44, 84.

Twiss, G. R., Science Teaching, 45, 332.

Tyler, H. W., History of Science, 45, 240.

U

Uhler, H. S., gallium-indium alloy, 41, 351; electrolysis of gallium, 42, 389; 43, 81; note on paper by Ch. Fabry, 49, 143, 148.

United States Bureau of Mines. See Mines, U. S. Bureau of.

— Coast Survey. See Coast Survey.

— Geol. Survey. See GEOL. REPORTS.

— magnetic declination, Jan. 1, 1915, Hazard, 41, 466.

— map on Lambert projection, 48, 164.

— National Museum. See National Museum.

Urine, Secretion, Cushny, 44, 159.

Utah, Abajo Mts., Thorpe, 48, 379; Green River desert section, Emery, 46, 551.

— Tintic Mining District, geology, Lindgren and Loughlin, 48, 246; minerals, Means, 41, 125.

V

Vancouver, geology, Burwash, 47, 79.

Vander Meulen, clays from Georgia and Alabama, 43, 140.

Van Klooster, H. S., Physical Chemistry, 49, 147.

Van Name, R. G., solution of metals in ferric salts, 42, 301.

Van Name, R. G., apparatus for determining freezing-point lowering, 43, 110; temperature coefficient of a heterogeneous reaction, 43, 449.
 — tri-iodide and tri-bromide equilibria, 44, 105; ionization of cadmium iodide solutions, 44, 453.
 — solution of silver in chromic acid, 45, 54; estimation of phosphorous, etc., acids in mixture, 45, 91; hydrolysis and conductivity of hypophosphoric acid, 45, 103.
 — preparation of hypophosphates, 46, 587.
Van Tuyl, F. M., geodes of the Keokuk beds, 42, 34; origin of dolomite, 42, 249; origin of chert, 45, 449.
Vapors, fluorescent, Silberstein, 42, 499.
Vaughan, T. W., origin of barrier coral reefs, 41, 131.
Venetia, geological history, Stefanini, 44, 299.
Vennes, H. J., retardation of alpha particles by metals, 44, 69.
Vermont, eruptive rocks at Cuttingsville, Eggleston, 45, 377.
 — Mineral Industries, 43, 490; 50, 238.
Vero, Florida, fossil human remains, Sellards, 42, 1; 47, 358.
Vertebræ, Evolution of, Williston, 46, 546.
Vertebrates, Comparative Anatomy, Kingsley, 45, 240.
Verwiebe, W. A., Berea formation of Ohio, etc., 42, 43; correlation of the Mississippian of Ohio, etc., 43, 301; Devonian shales of Ohio and Pennsylvania, 44, 33.
Very, F. W., transmission of terrestrial radiation, 41, 513; possible limit to gravitation, 48, 33.
Vibrations of bowed strings, mechanical theory, Raman, 48, 74.
Villavecchia, V., Chemistry, 45, 329; 46, 765.
Violins, mechanically played, Raman, 50, 465.
Virgilina district of Virginia, etc., geology, Laney, 45, 476.
Virgin Is., Scientific Survey, 50, 237.
Virginia, geol. survey. See **GEOL. REPORTS**.
 — Miocene, sail fish from, Berry, 43, 461.
Vogdes, A. W., Notes on Paleozoic Crustacea, 44, 336.
Volcanic domes in the Pacific, Powers, 42, 261.
 — emanations, Alaska, Shipley, 50, 141.
 — eruption, on Mt. St. Helens, Wash., Jillson, 44, 59; of Sakurajima in 1914, Koto, 43, 338.
 — phenomena in Hawaii, 43, 255.
Volcano, see **Kilauea, Mauna Loa**.
Tarumai, Simotomai, 44, 87.
Volcanoes, lava eruption of Stromboli, 1915, Perret, 42, 443.
Volcanologic investigations at Kilauea, Jaggar, 44, 161.
Von Fürth, O., Chemistry of Metabolism, 42, 442.
Von Richter, V., Organic Chemistry, 41, 368.
Vosmaer, A., Ozone, 42, 432.

W

Wade, B., Upper Cretaceous Fulgur, 43, 293.
Wadia, D. N., Geology of India, 49, 219.
Walcott, C. D., Cambrian Trilobites, 41, 301; Cambrian formation of Montana, 42, 372; Cambrian Trilobites, 42, 439; appendages of Trilobites, 47, 231; elected to French Academy, 49, 86.
Walker Museum, Contributions, 42, 82.
Walter, H. E., Human Skeleton, 47, 81.
War Neuroses, MacCurdy, 47, 147.
Waring, G. A., and **C. A.**, lavas of Morro Hill, So. California, 44, 98.
Warner, A. R., Dispensaries, 46, 771.
Warren, C. H., sphere for crystal optics problems, 42, 493; titaniferous augite, 43, 75.
Washburn, M. F., Animal Mind, 45, 240.
Washington, Eocene and post-Eocene formations, Weaver, 42, 81.
 — University of, Bureau of Research, 41, 471.
Washington, H. S., Charnockite series of igneous rocks, 41, 323; chemical analyses of igneous

rocks, 45, 238; augite from Stromboli, 45, 463; Chemical Analyses of Rocks, 48, 161; new leucite rock, 50, 33; rhyolites of Lipari, 50, 446.

Water power in Canada, 49, 388.

Watson, J. B., Psychology, 49, 221.

Weed, H. T., Chemistry in the Home, 45, 471.

Weld, L. D., Theory of Errors and Least Squares, 41, 562.

Wellisch, E. M., motion of ions and electrons through gases, 44, 1.

Wells, H. L., progress of chemistry, 1818-1918, 46, 259; Chemical Calculation Tables, 48, 161; analytical weighing, 49, 375.

West Indies, fossil Bryozoa, Canu and Bassler, 49, 83.

— geology and paleontology, Vaughan, 49, 82.

West Virginia, coal beds, Hennen, 46, 770.

— geol. survey. See GEOL. REPORTS.

Western Australia geol. survey. See GEOL. REPORTS.

— rounding of pebbles, Jutson, 48, 429; sheet-flows, Jutson, 48, 435.

Whetzel, H. H., Phytopathology, 46, 549.

Whipple, G. C., State Sanitation of Massachusetts, 43, 496.

White, W. A., Character Formation, 43, 254.

White, W. P., switch for thermoelement work, 41, 307; switch for delicate potential measurements, 46, 610; silicate specific heats, 47, 1; specific heat determination at higher temperatures, 47, 44.

Whitlock, H. P., crystal structure, 49, 259.

Whittaker, E. T., Modern Analysis, 41, 297; Edinburgh Mathematical Tracts, 41, 298.

Wickham, H. F., fossil beetles from Sangamon, Ill., 44, 137; fossil beetles, Vero, Florida, 47, 355.

Wieland, G. R., Flora Liasica de la Mixteca Alta, 42, 370; Fossil Cycads, Taxonomy, 43, 333; American fossil cycads, 46, 645; classification of Cycadophyta, 47, 391; Tetracentron-Drimys question, 49, 382.

Wiley, H. W., Beverages, and Adulterations, 47, 297.

Williams, H. S., fauna of Chapman Sandstone of Maine, 42, 169.— obituary notice, Schuchert, 46, 682.

Williams, S. R., achromatoscope, 41, 101.

Williamson, E. D., forms of calcium carbonate, 41, 473.

Williston, Samuel W., obituary notice, 47, 220.

Winchell, A. N., dustfall of March 9, 1918, 46, 599; 47, 133.

Windhausen, A., Cretaceous-Tertiary boundary in So. America, 45, 1; Argentine Neocomian, 47, 303.

Winton, A. L., Food Analysis, 44, 77.

Wisconsin, age of iron ore, Savage, and Ross, 41, 187.

— Fox-Winnebago Valley, 41, 374.— geol. survey. See GEOL. REPORTS.

— peat resources, Huels, 41, 225.

— physical geography, 42, 83.

— Quaternary Geology, Alden, 47, 143.

Wood, H. O., 1914 eruption of Mo-kuaweweo, 41, 383.

Wood, R. W., signalling by light rays, 49, 214.

Woodhouse, James, Life of, E. F. Smith, 46, 541.

Woodruff, L. L., Origin of Life, 46, 770.

Woods, H., Palaeontology, 50, 170.

Woolard, E., generalized relativity and gravitation, 45, 425.

World Power and Evolution, Huntington, 48, 396.

Wright, A. W., obituary notice, 41, 152, 361.

Wyckoff, R. W. G., Crystal structures of carbonates of calcite group, 50, 317.

Wyoming Historical and Geol. Society proceedings, 41, 381.

X

X-rays, absorption, Aurén, 48, 72; Owen, 47, 301; in aluminum, Williams, 46, 766.— analysis, sensibility, de Broglie, 49, 79.

X-ray spectra, de Broglie, **43**, 487; **44**, 484.
— from certain metals, composition, Kaye, **44**, 334.
— indices of refraction, Einstein, **48**, 471.
— penetrating power, Rutherford, **44**, 401.
— refraction, Barkla, **41**, 560.
— relations between spectra of, Ishiwara, **44**, 335.
— spectra of iodine and tellurium, Siegbahn, **41**, 465.
— wave lengths, Siegbahn, **43**, 167.

Y

Yerkes, Observatory. See **OB-SERVATORY**.

Young, C. A., Astronomy, **46**, 542; **47**, 386.
Young, S., Stoichiometry, **46**, 689.

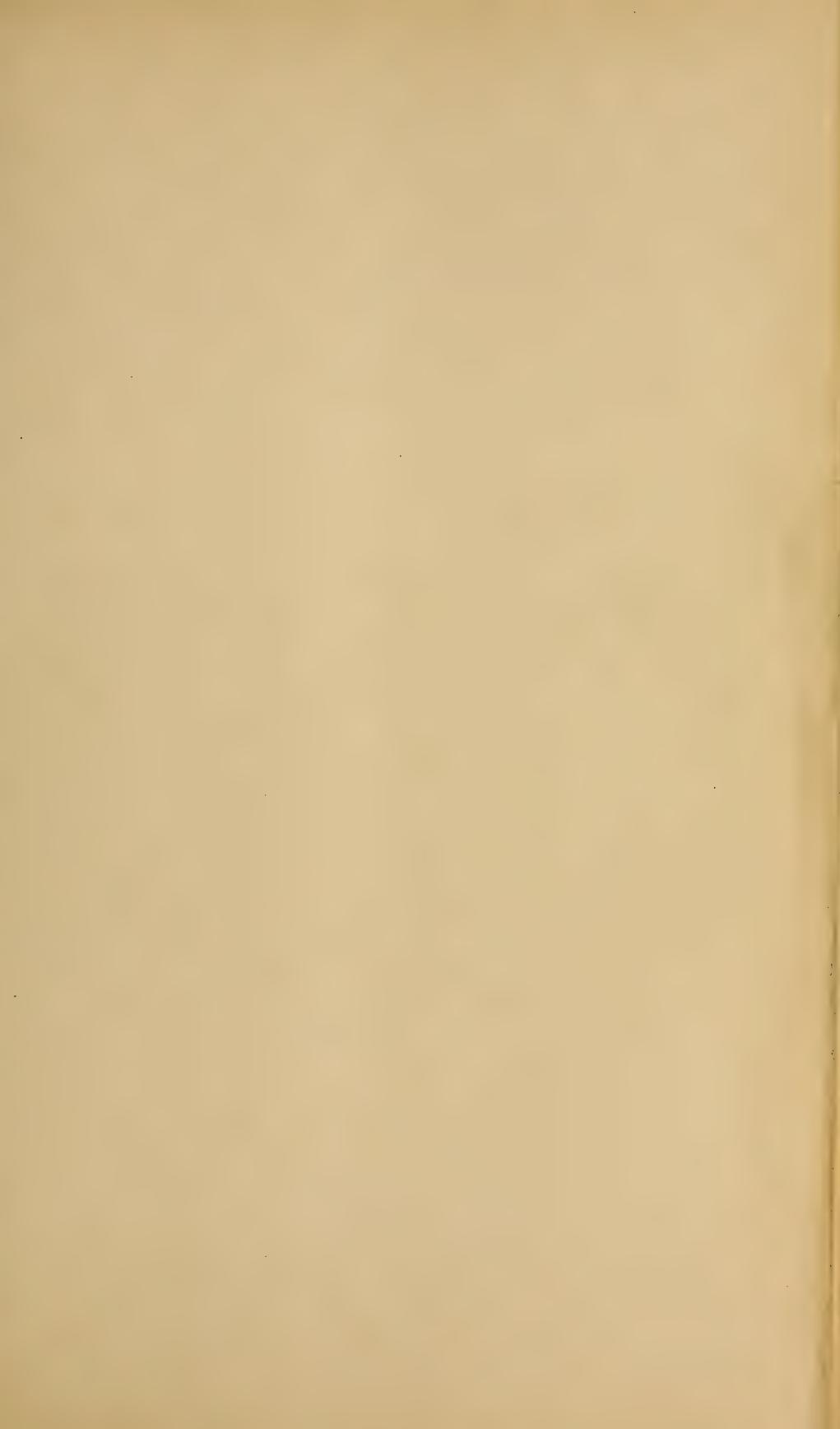
Z

Ziegler, V., Oil Geology, **45**, 423.

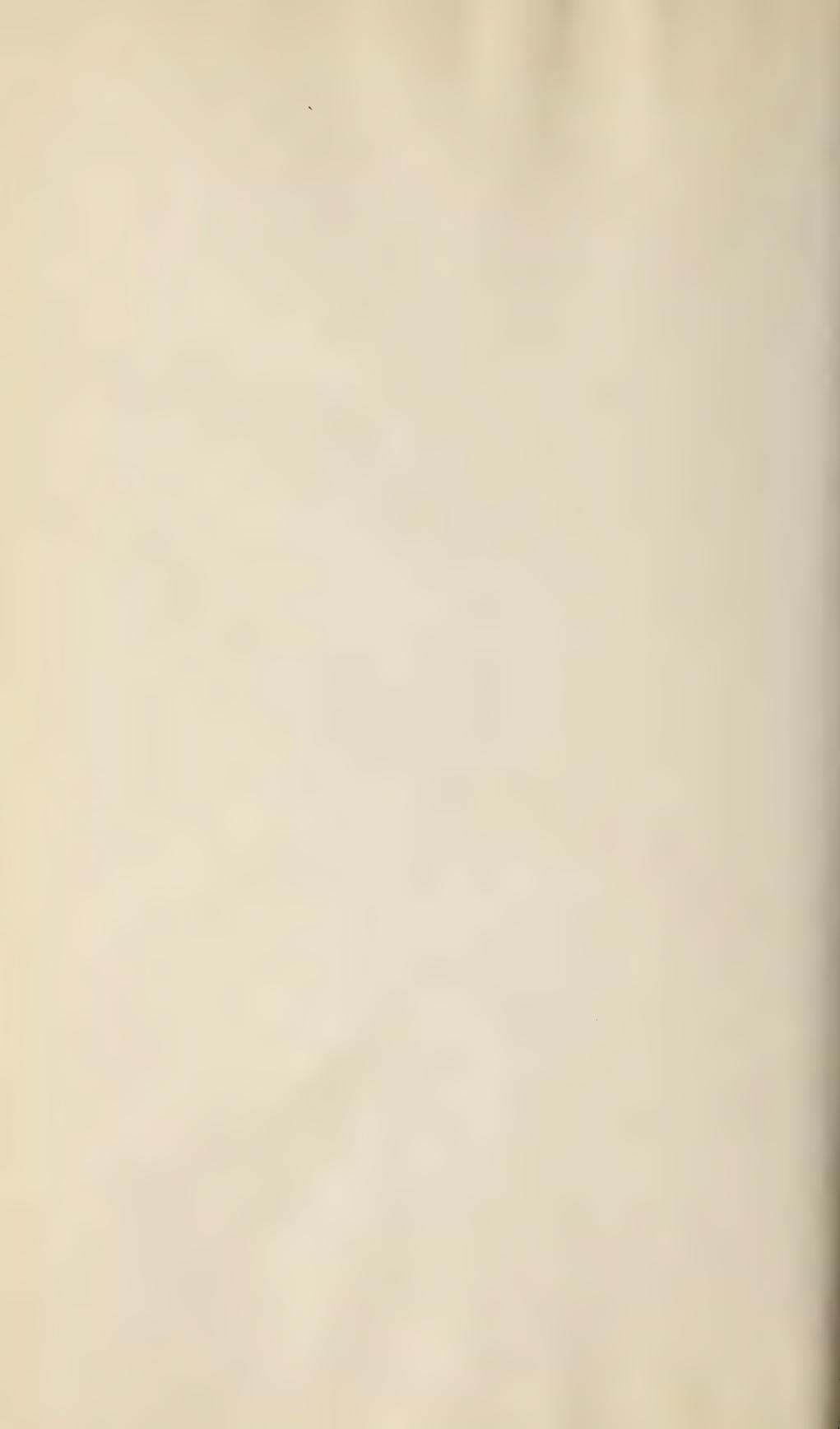
Zinc Industry, Smith, **46**, 689.

ZOOLOGY.

Crinoids, Existing, Clark, **41**, 150.
Edrioasteroidea, Bather, **41**, 302.
Zoology, Reese, **47**, 452; in America, 1818-1918, Coe, **46**, 355; Economic, Daugherty, **45**, 335; Elementary, Hyman, **49**, 84; Invertebrate, Pratt, **41**, 150; Practical, Hegner, **41**, 150; Vertebrate, Newman, **49**, 384.
— See **Animals, Birds, Insects**.



181595①



SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01298 6030